

September 6, 1956

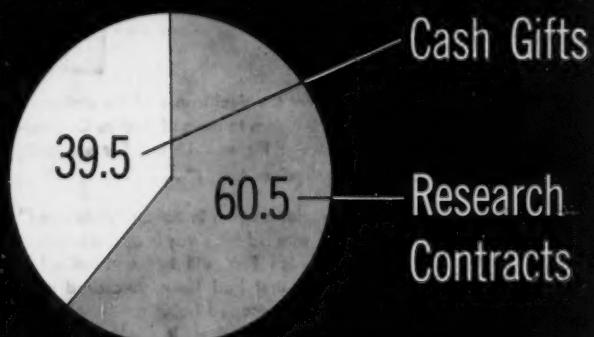
# The IRON AGE

The National Metalworking Weekly



How  
Business Benefits  
From Aid  
To Education P. 51

What Business Gives:



Total—\$100 Million (Academic Year 1954-55)

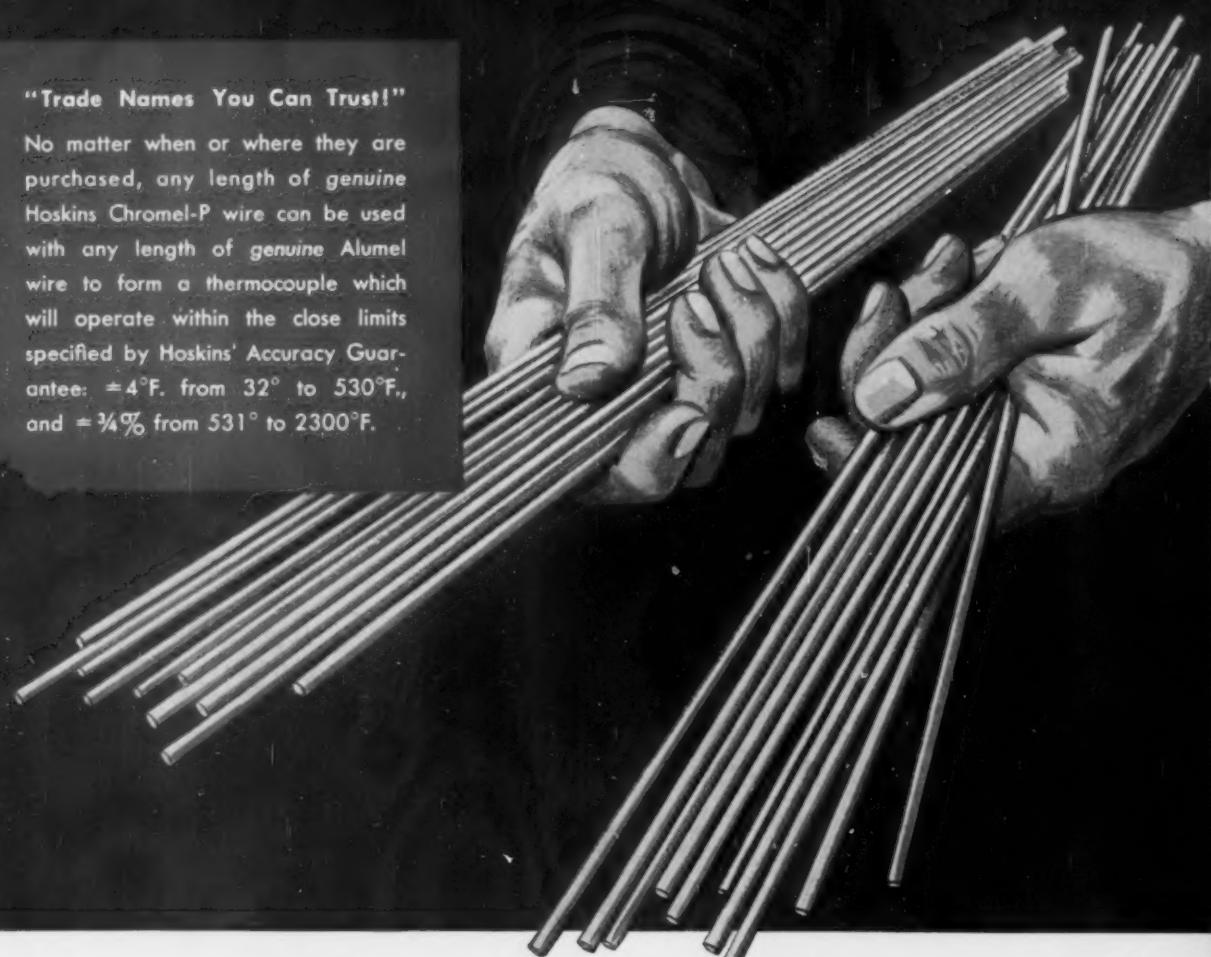
Coin Machines: Growing Metalworking Market P. 54

Tougher Vacuum Coatings Find New Uses P. 91

Digest of the Week P-2

"Trade Names You Can Trust!"

No matter when or where they are purchased, any length of genuine Hoskins Chromel-P wire can be used with any length of genuine Alumel wire to form a thermocouple which will operate within the close limits specified by Hoskins' Accuracy Guarantee:  $\pm 4^{\circ}\text{F}$ . from  $32^{\circ}$  to  $530^{\circ}\text{F}$ ., and  $\pm \frac{3}{4}\%$  from  $531^{\circ}$  to  $2300^{\circ}\text{F}$ .



# HOSKINS Chromel-Alumel

---

**THERMOCOUPLE ALLOYS**

**CONSIDER** for a moment the significance of the statement made above and what it means to users of Hoskins Chromel-Alumel thermocouple alloys the world over. For example, take "The Case of the Ageless Alumel" . . .

Not long ago, an industrial concern in Japan "discovered" 265 pounds of 8-gauge wire hidden away in a remote corner of their plant. Its Inspection Tag, still intact, identified it as being Hoskins Alumel that had been purchased over 20 years ago. How it had escaped being used during all those years no one knew. Inasmuch as it was still in good usable condition, however, the company wrote to inquire if it would be practical . . . or indeed even possible to have a similar quantity of 8-gauge Chromel-P wire specially processed so that its millivoltage would match that of the 1933-vintage Alumel. Imagine their surprise when they were advised that all Chromel-P alloy is specially processed by Hoskins to a uniform standard of quality, and that . . . "regardless of when produced or where purchased, any length of genuine Chromel-P wire can be joined to any length of

genuine Alumel to form a thermocouple which will register true temperature-emf values within the close specified limits of Hoskins Accuracy Guarantee."

No wonder, then, that Chromel-Alumel thermocouples are the world's basic standard of accuracy for the measurement of high temperatures. No wonder that the words "Chromel-Alumel" are recognized as . . . "trade names you can trust"!

**If you use thermocouples**, this new manual is meant for you! It contains complete specifications on Chromel-Alumel alloys, lists temperature-millivolt equivalents, explains standardization procedures, gives much useful application data. And it's yours for the asking without obligation. Send for your free copy today!

*Chromel-Alumel thermocouple alloys are produced exclusively by*

**HOSKINS MANUFACTURING COMPANY**

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## New Strength and Safety for the "Second Greatest Show on Earth"

When P. T. Barnum rode the fabulous cog railway up New Hampshire's 6288-ft Mount Washington, he dubbed it "the second greatest show on earth." Every summer, some 35,000 riders tend to agree.

The locomotives chuffing stubbornly to the summit look like museum pieces, and the right of way is somehow reminiscent of a roller coaster at an amusement park. Yet from the time the line started nearly ninety years ago no passenger has lost his life.

The line jealously guards this safety record, and this summer is placing in

service a spanking new coach, its first all-metal one. With emphasis on light-weight construction, the car will have an underframe built of Mayari R high-strength low-alloy steel. With a yield point a good deal higher than that of carbon structural steel, the Mayari R frame members can be much lighter and still provide all the strength that will ever be needed.

This is an off-the-beaten-track example of Mayari R's value in railway, automotive, structural and general manufacturing use. Mayari R is unusually strong, is unusually paint-adherent,

and unusually resistant to corrosion and abrasion. It can be welded and worked as readily as carbon steel. Catalog 353 explains it in detail, and shows dozens of interesting applications. You can get a copy through our nearest sales office.

**BETHLEHEM STEEL COMPANY**  
BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation, Export Distributor: Bethlehem Steel Export Corporation



**Mayari R** ... High-Strength, Corrosion-Resisting Steel

Sept. 6, 1956—Vol. 178, No. 10

## The IRON AGE

## Digest of the Week in Metalworking

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## NEWS DEVELOPMENTS

## PLASTIC COATED STEEL

HITS THE MARKET P. 55

U. S. Steel is putting a new plastic coated sheet into experimental production. It may find a ready market in appliance, automotive fields. In the steel coating field, porcelain enamel is also getting a boost.

## STEEL BIDS FOR REOPENING

OF FAST-TAX WRITEOFFS P. 56

Flurry of requests for fast-tax amortization on expansion projects revises question of whether steel goals will be reopened. Mobilization officials favor the idea.

## ADAMS BECOMES PRESIDENT

OF JONES & LAUGHLIN P. 57

Avery C. Adams has been elected president of Jones & Laughlin Steel Corp. Allison Maxwell, Jr., succeeds as head of Pittsburgh Steel. Reshuffle places top salesmen at helms of two companies. Austin vice chairman of J&L.

## APPLIANCES: EASY LIVING

HITS NEW HIGH P. 60

A report based on the 1954 Census of Manufactures indicates that home-



makers' desires for appliances are far from sated. Value of shipments in the industry is running six pct ahead of last year's record.



## WILL CONGRESS CUT HUGE DEFENSE OUTLAY? P. 73

Sentiment on both sides of the aisle indicates that defense appropriations will be re-evaluated. Problem is to cut huge outlay without undermining defense effectiveness or heavy dependence of economic system on defense expenditures. However, de-emphasis seems clearly to be favored.

## FEATURE ARTICLES

### VACUUM METALLIZERS REACH

#### NEW MARKETS P. 91

Vacuum metallizing, formerly classed with the decorative finishes, has now found what may be an even brighter future as a relatively low cost specialty coating. With precisely controlled film thickness, it adheres well to metals and nonmetals alike. A host of other favorable properties can make it a preferred choice at times over electroplating, chemical and organic coatings.

### DUAL FREQUENCIES PUT NEW LIFE IN HEAT TREAT LINE P. 96

In induction heat treating, the right frequency at the right power works best. This can mean costly equipment modification to handle variously sized workpieces. But there's another way—dual frequency. Using 180 cps coils to preheat, 9600 cps coils to harden, this firm jacked up hourly production 50 pct without increasing layout size.

### NEW BLADING ALLOY IMPROVES TURBINE PERFORMANCE P. 100

Turbine efficiency is linked to higher and higher operating temperatures. Blading materials that can't perform at better than 1000°F are fast becoming obsolete. A new, specially designed blading alloy has high strength, excellent damping capacity even at 1200°F.

### DOES SPECIFICATION BUYING SAVE ON TOOL LUBRICANTS? P. 102

Specification buying is common enough in the purchase of tool lubricants. But is it enough to simply set up chemical standards, then ask suppliers to meet them? The answer's an emphatic No. Sulfur's a for instance—of three kinds found in cutting oils, two add little or nothing to improve performance. Setting up performance criteria should prove a better method.

### HOW TO PICK ELECTRODES FOR PRODUCTION WELDING P. 104

By far the largest volume of welding done today is for joining mild steels. But with many electrodes to choose from, how do you narrow the field? Simplest way is to let comparative job costs make the choice. Overhead and labor make up 85 pct of welding costs, so fastest electrode's best.

## MARKETS AND PRICES

### VENDING MACHINES:

#### AUTOMATION IN SELLING P. 54

"Put a nickel in it," instead of being a derisive cry aimed at pioneer motorists, is now symbolic of one of metalworking's fastest growing markets—vending machines. Americans are expected to plunk almost \$2 billion into the vending machines this year.

CORPORATE giving to education benefits both business and education. Business aid to schools and colleges is running around \$100 million a year. But it's a good investment. Business is reaping a rich harvest. P. 51.

### WHY TESTING EQUIPMENT

#### MAKERS RESENT SLUR P. 59

BDSA report criticizes electronic testing equipment supplied armed forces. But makers say military policies discourage prime sources from staying in the business. Meanwhile, civilian business makes rapid gains while military dwindles.

### AUTO INDUSTRY MAY SET 4TH QUARTER MARK P. 68

Production may well exceed 1955's record fourth period in the auto industry. Large purchases of hot- and cold-rolled sheet presage heavy demand for radically different 1957 models. Escalator clauses will raise labor costs.

### WHO'S EXPANDING IN WEST COAST INDUSTRY? P. 75

Rundown on new Farwestern firms and those expanding facilities shows they manufacture a wide range of products. The area is a rapidly growing market for suppliers of machine tools, equipment and services.

### POST-LABOR DAY STEEL BOOM SHAPING UP P. 141

Watch for further tightening in the steel market after Labor Day. Bars are joining plates and structurals on the hard-to-get list. Bulge in automotive demand also will strain supplies of cold rolled sheets.

## NEXT WEEK:

### STAMPINGS: THE CASE FOR PRECISION CARBIDE DIES

Carbide dies, machined to gage-block accuracy, solve many a knotty cost or production problem in stamping and forming shops. Switch to these long-wearing dies usually means a better product made at lower per-piece cost.



# Ferrocolumbium



*now...*

## a new source

The use of Columbium is now free of any restrictions and may be again employed as a valuable alloying material, recognized for improving high temperature properties and increasing corrosion resistance.

In announcing the addition of this product to its line of metallurgical alloying elements, the same reliable MCA technology is offered that has distinguished MCA molybdenum, tungsten, boron and rare earths . . . faithful uniformity in fulfilling specifications . . . deliveries to accurately anticipate customer's requirements.

Further, the sources of supply for the raw material are plentiful, and will continue to increase.

MCA Ferrocolumbium is available in a variety of screen sizes to meet manufacturing requirements. It will pay you to investigate this new supply source, today.

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## **OSBORN** **MOL-DEX\***



**New automatic molding machine offers you unequalled flexibility... highest production... greatest dependability**

Now, for the first time, even semi-production foundries can take advantage of the economies of automatic molding.

Today's most flexible molding machine, MOL-DEX is the *first* to incorporate the stripping of cores and rockover of drags in a single piece of equipment. Floating platen permits quick pattern changes.

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\*Trade-Mark



Core Blowers

Molding Machines

Industrial Brushes

*Leader in automation for the foundry*

*September 6, 1956*



## 3 kinds of help on sheet and strip steel

Sheet and strip buyers tell us that three kinds of purchasing help keep them coming back to Ryerson:

**1. WIDER SELECTION OF TYPES**—More than 20 kinds of sheet and coil stock are on hand in an unusually wide range of gauges—making it easier to get the exact steel needed for any requirement.

**2. GREATER PROCESSING CAPACITY**—The most extensive cutting and processing facilities in the steel-service industry enable buyers to get quickest service on requirements for special sizes, strip and sketch cutting, blanks, slit coils, edging, or any other processing.

**3. HELP ON SHEET AND STRIP PROBLEMS**—The large Ryerson staff of sheet and strip specialists gives buyers a valuable source of help in selecting the most satisfactory and economical stock—or in solving any other problem of application and fabrication.

In addition, sheet and strip buyers like the good packaging, the dependable weight and on-schedule delivery that they get from Ryerson—and the convenience of one-order buying of all steel products from the same source. So call your nearby Ryerson plant for 3-way help on sheet and strip needs.

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# IRON AGE

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Indexed in the Industrial Arts Index  
and the Engineering Index.



# EDITORIAL

## You Who Are About To Retire!

• YOU JUST CAN'T DO IT. You can't up and quit cold after working 30 or 40 years at a breakneck pace. If you planned your retirement when you were about 35 maybe it could be done. But how many do that?

Retiring is something far more complex than many think as they dream of what they will do "when they have the time." Men must "belong." They have to be a part of something basic. A life-long pattern is not easily changed.

Recently it has been established that what keeps us ticking is how we think, what we do and why we do it. We have to have enthusiasm and a desire to live an active life; else we chance dying on the vine.

Boredom and lack of enthusiasm will age you faster than anything. Men who have been active all their lives just can't stand aside and watch from the sidelines without something giving. It is being a part of things, doing things and learning something new each day that pays off in the end.

We can't help but think of our lovable friend, that active and enthusiastic Scotsman, Don Gillies, who thinks he has retired at 83 as a Republic Steel consultant.

We say "thinks" because knowing him and knowing that he has been a veritable fireball since he passed 65, we know he will never "retire." He will be in all corners of the earth, suggesting to Republic's Charlie White what ought to be done about ore, helping the President of Liberia on a tough problem or giving the Cleveland Red Cross information on how to raise money.

Don Gillies never quit working, thinking, dreaming and traveling. He didn't dare to. He knew that keeping busy, making—and keeping—friends and learning more each day was the real secret of life. Take a tip from him; don't plan on becoming a vegetable.

If you must retire because of a compulsory age limit, get another job or at least a connection or strong interest. But be sure it is something that keeps you enthused, makes you sparkle, blots out ailments and worries. Be sure it gives you something which allows you to say "this is mine; I did it" or "Sure I know him; I will be seeing him next week."

If you take off your boots, keep them close by!

*Tom Campbell*

EDITOR-IN-CHIEF

# Textures in Steel...

## MAKE AUTOMOTIVE DESIGNING EASIER

SINCE rolled-in design patterns in steel were first developed at Sharon, more and more product stylists are finding ways in which it makes their jobs easier.

For example, Sharonart\* is the ideal metal for use where extra wear leaves unsightly marks—such as automotive kick plates, ash trays, radio panels, etc. Too, Sharonart\* enables designers to change the style by simply changing the steel—new parts from old dies. And, surface patterns in the steel enable designers to expand style themes right into the metal itself without special press work.

If you are not already familiar with this exciting metal, why not contact your Sharon representative today and get all the details.

SPECIFY

# Sharonart

*New style  
from Old Dies*  
is possible by altering  
the surface patterns of  
the metal.



*Won't mark or  
show scratches!*  
Ideal for spots that must  
take extra heavy wear.



**SHARONSTEEL**

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10028

*Smart distinctive appearance*

can be easily achieved through  
discriminative use of this  
textured surface steel.

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\*SHARONART—Trademark registered by the Sharon Steel Corporation.

dear editor:

letters from readers

### Phobia or Fixation?

Sir:

One of the penalties of an editorship such as yours is to have strangers address you by your first name and then proceed to the attack.

Sure, let's let George do it, again and again . . . (Your August 16 editorial on Secretary of the Treasury Humphrey) . . . but . . . "balancing the budget . . . is a fixation with the Secretary . . . back when I went to school a phobia



LET GEORGE DO IT . . .

represented a thing to fear, and a fear itself. Not that my appreciation for your analysis and for George's accomplishment is in any way lessened! Peter Arnold, Hanson-Van Winkle Munning Co., Matawan, N. J.

### More Attractive

Sir:

In your July 5 issue I read the article "Magnets: Design Changes Are Coming" with much interest but was under the impression that I was reading about something really new and up-to-date.

Although this article claims that the new substance (MnBi) is now in commercial development stage, I have since had occasion to refer to the Defense Department's "Scrap Yard Handbook"

(dated October 1955) and note that BISMOL is listed as a material to be salvaged whenever possible. It is described as "a combination of bismuth and manganese, both of which are non-magnetic, but together form a permanent magnet with the highest coercive force known, possibly supplanting high-nickel-cobalt alnico magnets in many uses."

Evidently, this material is not so new and has long since passed through basic development if it was used in equipment showing up at defense salvage depots last year. *R. J. Dames, Kearny, N. J.*

It is new. Here is a reply from J. A. Osborn, Manager, Magnetic Materials Dept., Westinghouse Electric Corp.—Ed.:

As far as I am aware, Bismol has not been used in Defense Dept. equipment or any other equipment except on a very limited experimental basis . . . The properties of the manganese bismuth developed here differ appreciably from that reported by the Naval Ordnance Laboratory or by other earlier investigators. Our material is a single phase material. The older process contains mixtures of some form of manganese bismuth and probably free manganese and free bismuth. Unlike the older process, this means that all of our material is magnetic and requires no time-consuming or expensive magnetic separation as part of the total process of preparing the permanent magnet.

The most important difference, however, is that the manganese bismuth we produce has a considerably higher magnetic moment than that reported for the older processes . . .

There are both high and low temperature phases of this material. By the older process, it must necessarily result that there be admixtures of these two, together with free manganese and free bismuth. On the basis of these criteria, I think it is fair to say that we have a different material than that reported by the Naval Ordnance Laboratory.

As far as I can tell from their process, the forms of manganese bismuthide which they obtained are made up of equal atomic portions of manganese bismuth. Hence, in one sense you could say that we have the same material. However as you realize, there is a vast difference between what you can do with a given starting material and the end products which you obtain therefrom.



### HOW DOES GARRETT GIVE SUCH SERVICE?

What others may call impossible Garrett comes through as routine service. It seems as though they treat each order as the only one in their three plants. Everybody pitches in for service with the customer in mind.

If it is a stock item such as lock washers, flat washers, spring washers or hose clamps the order is usually on the way the same day. If it is stampings or assemblies Garrett engineers, production men and die makers team up to make their high-speed automatic equipment really hum . . . and your order is in your hands in half the time.

Want to be surprised by real service you can't beat? Next time send your order to Garrett for . . .

LOCK WASHERS  
FLAT WASHERS  
HOSE CLAMPS  
SPRING WASHERS  
STAMPINGS

Manufactured by  
**GEORGE K. GARRETT CO., Inc.**  
Philadelphia 34, Pa.





***Traveloader* does a job here  
no other handling machine can do!**

Traveloader easily picks up long, awkward loads from the side and carries them securely and speedily to near or distant points—without changing travel direction. This unusual feature enabled a large mid-western steel company to set up a highly efficient system for handling and yard-storing heavy curved corrugated steel plate sections.

Unit loads weighing up to 9,000 pounds are placed on the Traveloader by overhead crane at the fabricating department, transported to storage area and tiered along 12-foot aisles. As needed, sections are picked up by the Traveloader and delivered to the shipping platform. A special attachment permits handling of single sections or "split lifts."

As a direct result of this method the company uses yard space to much better advantage, fills orders faster and substantially reduces handling manpower.

The Traveloader also handles pipe, lumber, loads weighing over 4,000 pounds and any awkward loads. It does yard maintenance work, positions machinery and performs many other handling jobs not practical or possible with any other equipment.



Write for Bulletin 1360. It completely describes the remarkable TRAVELOADER that carries like a straddle truck, delivers like a road truck, and stacks like a fork truck.

**Baker**

handling equipment

**THE BAKER-RAULANG COMPANY**  
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A subsidiary of Otis Elevator Company

675

## fatigue cracks

### Inside Iron Age (III)

"Why don't you run more on titanium?" "How do your editors decide what articles to run, anyway? Why don't they have more on our kind of work?"

Our man Abercrombie has just returned from a depth-interview with Technical Editor John Obrzut, which interview was designed to answer these and similar questions we frequently get from readers. (For your information a "depth-interview" is an interview that lasts at least an hour.)

His report, considerably boiled down—some might say hacked to a shred—follows: Major thing an editor has to keep in mind is "Who are my readers?" Impossible to know all about 173,554 readers but can classify them several ways: What are their jobs; what kind of equipment do their companies use; what products do they make?

#### What's He Do?

First question very simple from circulation audit: Some 23 pct of THE IRON AGE readers are in administration (company officers, general managers, etc.); more than 31 pct are engineers (chief, design, metallurgical, etc.); then there are 30 pct in the production end (works managers, department superintendents, etc.) and 12 pct in purchasing.

Second question is important so editors know where to place emphasis. IA's Research Dept. keeps editors posted on this through its own census work. These figures (68 pct operate machining departments, 48 pct welding, 42 pct stamping, etc.) help adjust balance to reader interest.

Finally, editors must know what readers make, determine it from Research Dept. which gets it from pushing buttons on IBM unit, comes up with major products of all readers' plants.

Another help in deciding what to publish is by talking with readers. Interviews by research organizations are a must—some 2000 readers will be interviewed this year. Interview results are taken seriously but never permitted to overrule editorial judgment. Example: A reader once asked: "Why don't you have more on titanium?" That's the year in which—prior to the question—your f.f.j. had carried some 16 articles on titanium, plus a special 32-page report on it.

#### It's a Balancing Act

When all this information is considered—editors keep it in the back of their minds—they have some idea of balance. They check this balance weekly, double check quarterly to give readers a balanced diet.

Abercrombie's report stops abruptly at this point with a cryptic note, "Matter of how editors decide what's new, accurate is major part of subject. Would require 2-day interview. Advise."



"IT IS IMPORTANT to know the reader's problems . . ."



### Can 0.0005 inch precision strip simplify your product design?

From 0.0005 in. to 0.040 in. thick and 0.090 to 6 in. wide, these alloys are available as special-tolerance strip:

**Beryllium Copper**  
**Phosphor Bronze**  
**Nickel Silver**  
**Brass**  
**Chromium Copper**  
**Stainless 17-7PH**  
**Invar**  
**Magnetic: High Nickel**

Some immediately available. Others rolled to order in 2 to 21 days. Can be supplied in coils or straight lengths with slit or filed edges—also cadmium plated.

Write for Bulletin 7  
TODAY.

# PENN

PRECISION PRODUCTS, INC.

501 Crescent Avenue • Reading, Pa.

#### SALES OFFICES

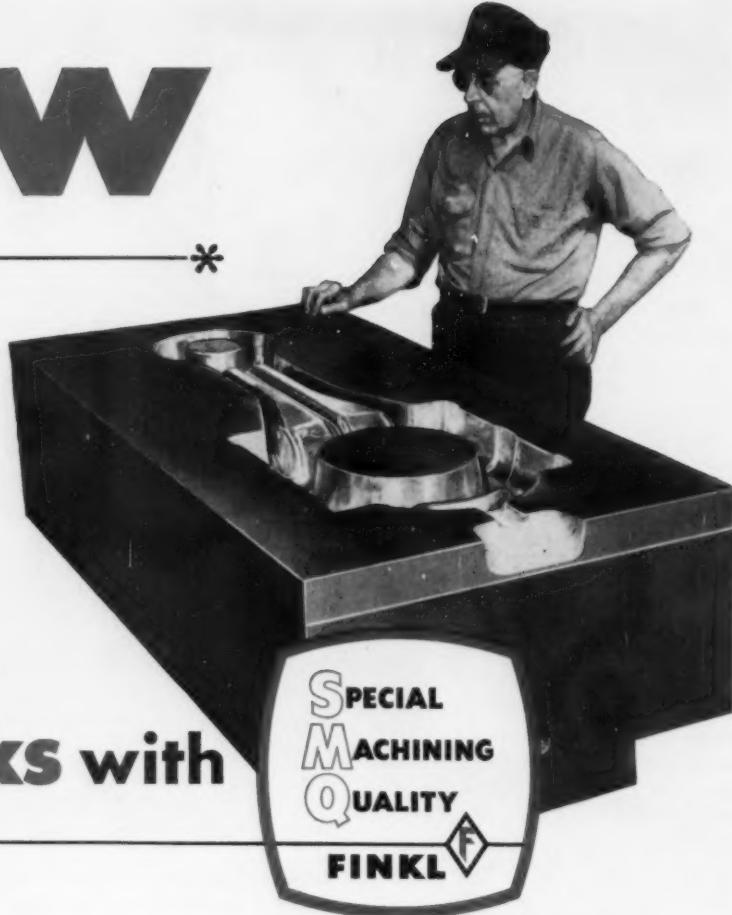
New York	Philadelphia
H. G. WILLIAMS	J. A. RHODES
Ramsey, N. J.	Upper Darby, Pa.
Boston	
F. G. STROKE	St. Louis
Cleveland	J. A. CROWE
L. D. ALSPACH	Houston
Chicago	RANDOLPH
R. A. BURKETT	SALES CO.
Los Angeles	KRUSEN WIRE & STEEL CO.

#### WAREHOUSES

New York	BERYLLIUM COPPER SUPPLY CO.
Little Falls, New Jersey	
Chicago	PRECISION STEEL WAREHOUSE INC.
Los Angeles	KRUSEN WIRE & STEEL CO.

# NOW

**SINK  
DIES  
FASTER  
in FINKL  
Die Blocks with**



**SPECIAL  
MACHINING  
QUALITY**

**FINKL** F



Machining time, such as planing, rough cutting, milling, hand benching and burring are appreciably reduced on Finkl SMQ Die Blocks. Thorough field testing shows that the Special Machining characteristic of SMQ saves shop time and gets the die into production sooner.

There is a Finkl steel available for any forging need. All are quality controlled through each step from our own melt shop to final inspection.

When you next consider die blocks, your local Finkl representative will gladly help you plan for "impressions that last."

**DIE BLOCKS**  
•  
**HOT WORK  
STEELS**  
•  
**FORGINGS**  
•  
**ELECTRIC  
FURNACE  
STEELS**

Offices: DETROIT • CLEVELAND • PITTSBURGH • INDIANAPOLIS  
HOUSTON • ALLENTOWN • ST. PAUL • COLORADO SPRINGS  
SAN FRANCISCO • SEATTLE • BIRMINGHAM • KANSAS CITY  
Warehouses: CHICAGO • BOSTON • LOS ANGELES

**A. Finkl & Sons Co.**  
2011 SOUTHPORT AVENUE • CHICAGO 14

## dates to remember

### SEPTEMBER

**Metal Powder Assn.** — Fall meeting, Sept. 7-9, Homestead, Hot Springs, Va. Society headquarters, 420 Lexington Ave., N. Y.

**American Institute of Chemical Engineers** — Fall meeting, Sept. 9-12, William Penn Hotel, Pittsburgh. Society headquarters, 120 E. 41st, N. Y.

**The American Society of Mechanical Engineers** — Fall meeting, Sept. 10-12, Cosmopolitan Hotel, Denver, Colo. Society headquarters, 29 W. 39th St., N. Y.

### EXPOSITIONS

**The Packaging Machinery Manufacturers' Institute**, Sept. 11-14, Cleveland.

**Assn. of Iron & Steel Engineers**, Sept. 25-28, Cleveland.

**Metal Show** — Oct. 8-12, Cleveland.

**Society of Automotive Engineers** — National tractor meeting and production forum, Sept. 10-13, Hotel Schroeder, Milwaukee. Society headquarters, 29 W. 39th St., N. Y.

**American Die Casting Institute** — Annual meeting, Sept. 11-13, Edgewater Beach Hotel, Chicago. Society headquarters, 366 Madison Ave., N. Y.

**Porcelain Enamel Institute** — Annual meeting, Sept. 12-14, Broadmoor Hotel, Colorado Springs, Colo. Society headquarters, 1145 19th St., N. W. Washington 6, D. C.

**American Society for Testing Materials** — Second Pacific area national meeting and apparatus exhibit, Sept. 16-21, Hotel Statler, Los Angeles. Society headquarters, 1916 Race St., Philadelphia.

**Instrument Society of America** — Eleventh annual international instrument-automation conference and exhibit, Sept. 17-21, New York Coliseum, N. Y. Society headquarters, 1319 Allegheny Ave., Pittsburgh.

**American Hot Dip Galvanizers Assn.** — Semi-annual meeting, Sept. 20-21, Greenbrier Hotel, White Sulphur Springs, W. Va. Assn. headquarters, 1806 National Bank Bldg., Pittsburgh.

**Steel Founders' Society of America** — Fall meeting, Sept. 24-25, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 606 Terminal Tower, Cleveland.

**The Material Handling Institute** — Fall meeting, Sept. 24-26, The Greenbrier, White Sulphur Springs, W. Va. Society headquarters, 813 Clark Bldg., Pittsburgh.



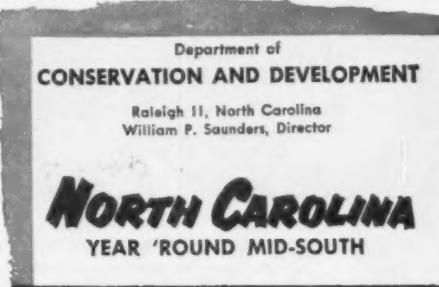
Industries locating and expanding in North Carolina have access to the nation's largest labor pool. A supply of young and healthy people, over 99 per cent native-born, eager to work, easily trained, is conveniently available.

This great source of desirable men and women employees is swelled each year as mechanization comes to the farms, and as more students graduate from the schools.

A network of paved secondary rural roads links factories with dependable labor dispersed over a large radius. This same outstanding highway system also makes it possible for workers to hold down full time jobs and at the same time easily supplement their income with "kitchen" gardens and small scale farming.

These people live pleasantly and comfortably, too—over 96 per cent of all farm homes are electrified.

More information about North Carolina's labor supply and other industrial advantages will be gladly supplied in confidence and at no obligation.



# How Morse Distributor critical indexing problem

**H. C. Smith Oil Tool Company increased production one-third, reduced labor cost 30%—another example of how Morse Distributors serve industry.**

When the H. C. Smith Oil Tool Company, of Los Angeles, faced a precision indexing problem in machining gear-type oil drill bits, they called a Morse Distributor.

Harold Kimmel, sales engineer for J. W. Minder Chain and Gear Company, analyzed the operation. He specified Morse MC 6000 Cam Clutches to provide an in-

finitely accurate feed for the milling process. Result: an increase of end milling machines from two to three cutting units, at a labor cost saving of 30%.

Read the picture story, and see why you can rely on Morse Distributor engineering service and complete stocks for fast answers to your power transmission problems.



"The Morse MC 6000 Cam Clutch was the ideal solution to the precision indexing problem in this high-speed milling operation," says Harold Kimmel, sales engineer for the J. W. Minder Chain and Gear Company. It is accurate up to 1/10,000 of an inch.

# engineering service solved in milling operation



R. E. Goetz (center), manufacturing engineering supervisor, and H. E. Kidder, factory manager of H. C. Smith Oil Tool Company, outline problem to Harold Kimmel. Slight indexing errors are cumulative in milling gear-type cutters shown.



Kimmel gets on-the-spot information while watching Milling Foreman Lloyd Fage run high-speed, two-flute end mill. He notes that present differential transmission and worm gear indexing systems are inaccurate and slow down production.



Kimmel and stock clerk select an MC 6000 Cam Clutch right off the shelf. Complete local stocks of Morse products make a big difference on rush power transmission problems.

## Morse Distributors can help you

Call in your local Morse Distributor when you need power transmission equipment.

- He can give you skilled engineering assistance on all power transmission problems.
- He offers complete stocks of Morse precision-built power transmission equipment, ready for immediate delivery.

Call on your Morse Distributor any time for fast service, quality products, and experienced engineering help. He is only as far from you as the Yellow Pages of your local telephone directory.



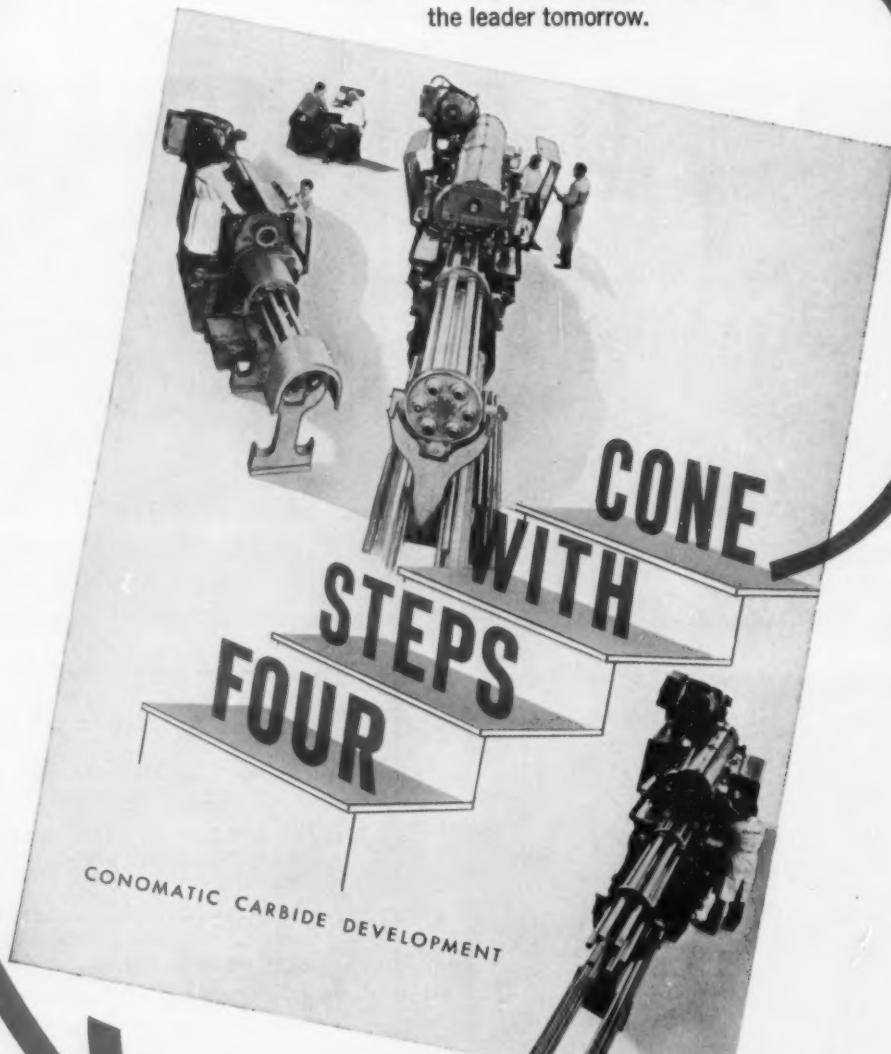
MORSE CHAIN COMPANY  
INDUSTRIAL SALES DIVISION  
ITHACA, N.Y.

# MORSE



POWER TRANSMISSION  
\*Trademark PRODUCTS

If you haven't read this important booklet, your production line may be operating at less than peak efficiency. Your operations may be beating competition with HSS today, but you will likely need carbide tooling to be the leader tomorrow.

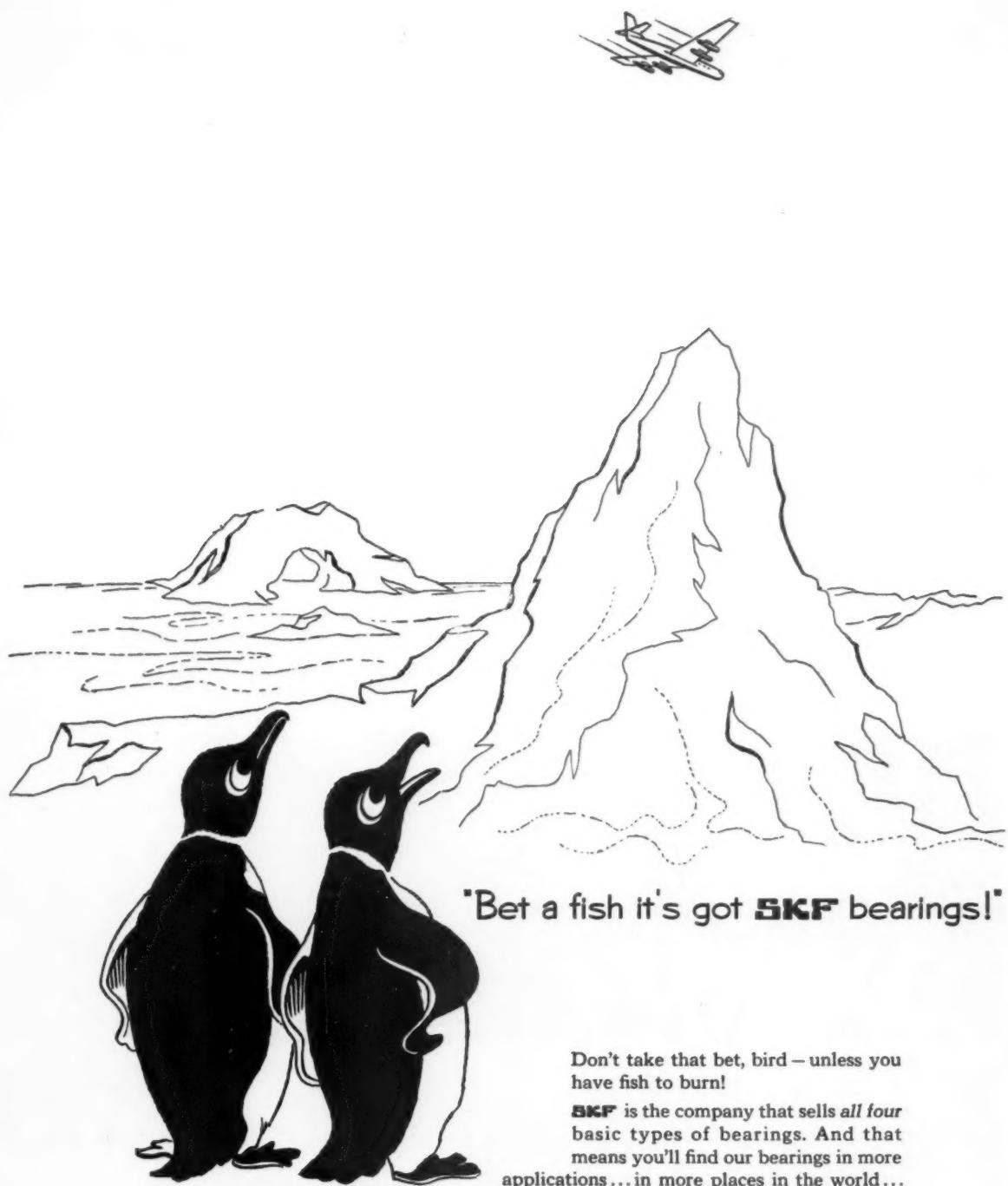


Write for your free copy of this important booklet today!



# Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U.S.A.



"Bet a fish it's got **SKF** bearings!"

Don't take that bet, bird — unless you have fish to burn!

**SKF** is the company that sells *all four* basic types of bearings. And that means you'll find our bearings in more applications... in more places in the world... than any other bearings. In everything from roller skates to roaring jets, these bearings literally make the world go round. *Plus-quality* **SKF** Bearings are serving your industry, your family and you right now! 7728



**SKF**

**SKF—EVERY TYPE—EVERY USE**

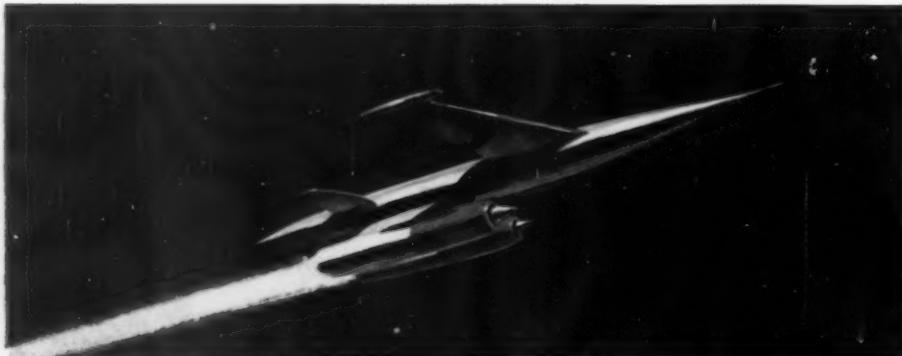
- Ball Bearings**
- Cylindrical Roller Bearings**
- Spherical Roller Bearings**
- Tapered Roller Bearings (Tyson)**

\*Reg. U.S. Pat. Off. Tyson Bearing Corporation

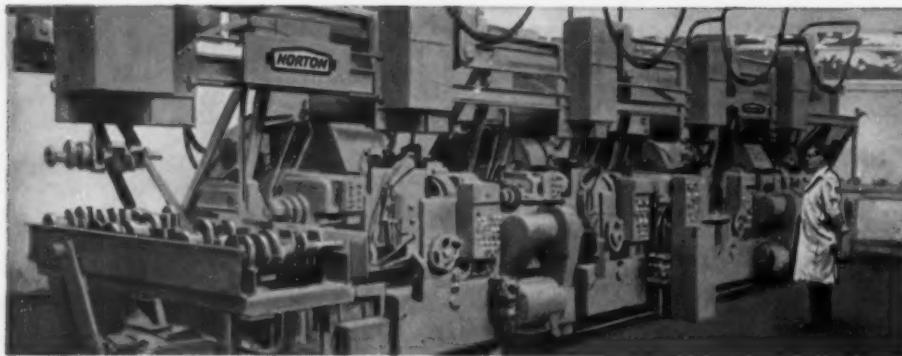
**SKF INDUSTRIES, INC., PHILADELPHIA 32, PA.**



*A job that reaches  
from Death Valley*



Rockets and Jets blast through nozzles coated with ROKIDE® "A", a Norton-developed refractory material that resists temperatures up to 3600°F. Jet planes slice the air with glass-smooth wings, polished on ten-foot-wide abrasive belts produced in Norton's Behr-Manning plant.



**Automation in Automobile Plants.** This Transfer Type Automatic Crankpin Grinder is an original development by Norton engineers. It grinds automobile crankshafts automatically — including all locating, grinding, gauging and transferring operations — entirely without human aid.

**Across the world — and still expanding:** **Abrasive and Grinding Wheel Plants** — Worcester, Mass.; Santa Clara, Calif.; Hamilton, Ontario; South Africa; England; France; Germany; Italy. **Grinding and Lapping Machine Plant** — Worcester, Massachusetts. **Electric Furnace Plants** — Huntsville, Alabama;



# *to outer space*

California's Death Valley area — a barren wasteland? Not altogether, for there are important minerals here. Borax, for one, which is shipped to Norton to be processed into various boron compounds — including NORBIDE\* boron carbide, the hardest material made by man for commercial use.

These borax-derived materials are characterized by extremely high resistance to heat and other unusual properties. Some, for example, are used as jet propulsion and rocket components — and so, the job Norton begins in Death Valley reaches far into outer space.

Norton, in fact, starts almost every product it makes. Norton electrochemically refines these products and

processes them into final finished form.

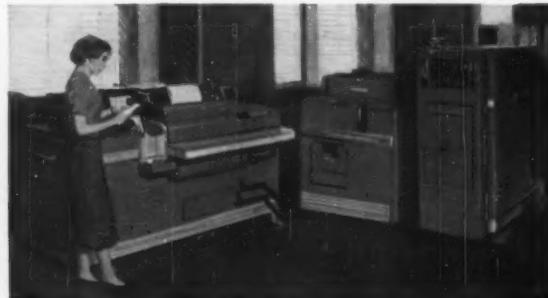
This practice of starting projects from their very beginning has led to the development of many Norton "firsts", a few of which are described below, and all of which are working out to the benefit of industry.



**Making better products... to make your products better**



**Harder Steels** called for sharper cutting abrasives. Norton answered with 32 ALUNDUM\* abrasive, made by a new process that resulted in much faster, cooler cutting action. This famous Norton "first" is one of industry's most widely used abrasives.



The "Electronic Brain", first to be used for billing in industry, keeps accurate track of Norton customers' and distributors' needs. Other electronic computers are used in plotting statistics for quality control and other production requirements.

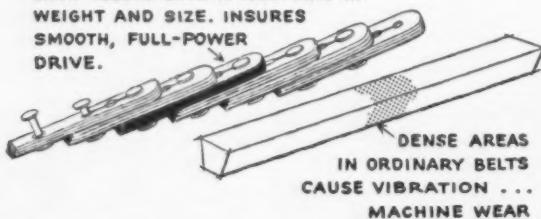
Chippawa, Ontario; Cap-de-la-Madeleine, Quebec. **Behr-Manning Plants** — **Coated Abrasives and Behr-cat® Tapes** — Troy, N. Y.; Canada; Australia; France; Northern Ireland; Argentina. **Norton Pike Plant** — **Sharpening Stones** — Littleton, New Hampshire. **Refractories and Electro-Products Plant** — Worcester, Massachusetts. **Bauxite Mines** — Bauxite, Arkansas.

\*Trade-Marks Reg. U. S. Pat. Off.

**Main Office:** Norton Company, Worcester, Massachusetts.

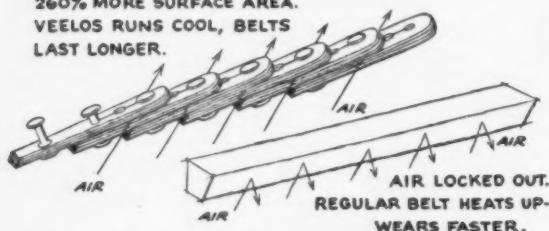
# Six Reasons Why Veelos Adjustable V-Belts Are Better For Your Drives!

EACH VEELOS LINK IS IDENTICAL IN WEIGHT AND SIZE. INSURES SMOOTH, FULL-POWER DRIVE.

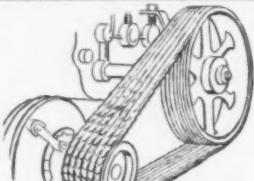
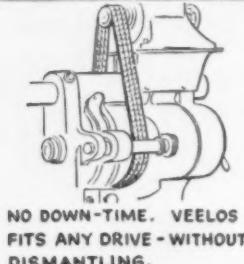


**1. Balanced construction** of Veelos Belts assures you faster, cleaner work, less rejects . . . less bearing wear. Each link and stud is identical in size and weight. Ordinary belts have varying spots of density which cause excess vibration—chatter marks, machine wear.

260% MORE SURFACE AREA. VEELOS RUNS COOL, BELTS LAST LONGER.



**3. Cooler running—long life!** Veelos breathes! Constant circulation of air keeps Veelos running smooth. Regular V-belts have no chance to cool, heat builds up from the inside . . . causes slippage, wastes power, heats bearings, reduces belt life.

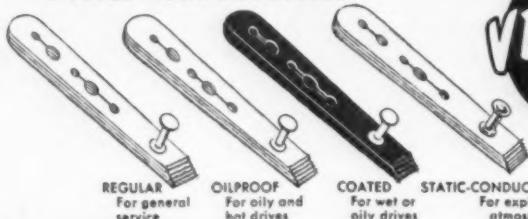


NO DOWN-TIME. VEELOS FITS ANY DRIVE - WITHOUT DISMANTLING.

EACH VEELOS BELT CAN BE ADJUSTED - NO NEED FOR EXPENSIVE MATCHED SETS.

**5. Simple installation** "knocks out" down-time! Saves up to 50% installation time on outboard bearing drives, more when belt length isn't in stock. No resetting, tilting or moving motors. Veelos can be made any length, can be changed by adding or removing links.

## 4 TYPES—FOR ALL DRIVES



Known as VeeLink outside U.S.A.

For all sizes and types of drives. Double-V available for serpentine drives.

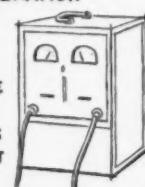
STROBE LIGHT PIN-POINTS

CAUSE OF COSTLY VIBRATION.

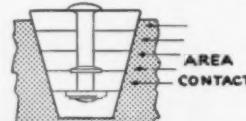
YOU CAN SEE IT - MEASURE IT - ELIMINATE IT.

MEASURES VIBRATION DOWN TO 2 MILLIONTHS OF AN INCH.

COMPARES THE DIFFERENCE, YOUR ENDLESS BELTS AGAINST VEELOS.



**2. Electronic proof**—up to 90% less vibration! With a vibration analyzer, you see, on your own machine, how Veelos belts decrease vibration up to 90% over any belt you're now using. This amazing Veelos test pin-points the belt that has the "invisible shakes."

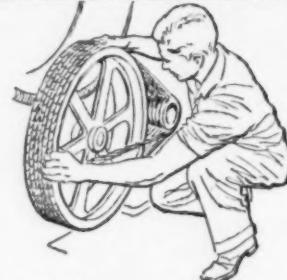


PERFECT VEELOS FIT. EXTRA THICKNESS AND MACHINE-CUT SIDES PREVENT BOTTOMING. MEAN CONSTANT POWER.



POWERLESS POINT CONTACT OF ORDINARY V-BELT. BULGES, SLIPS, CAUSES UNEVEN SHEAVE WEAR.

**4. Greater flexibility** reduces slippage! Sectional construction, beveled links allow greater flexibility, longer belt life. Each link moves around sheave independently and maintains full contact, constantly. Full area contact allows shorter centers, smaller sheaves.



MEASURE VEELOS 1" SHORT PER FOOT AND FORCE ON DRIVE BY ROLLING. IT WON'T STRETCH.

**6. Veelos won't stretch** any more than ordinary endless V-belts when it is properly installed. Remember—measure Veelos 1" short per foot and roll on drive as tightly as possible. With the first few revolutions Veelos studs accept a permanent set into the sections they connect.

Write for free Veelos Data Book or Veelos Vibration Demonstration to:

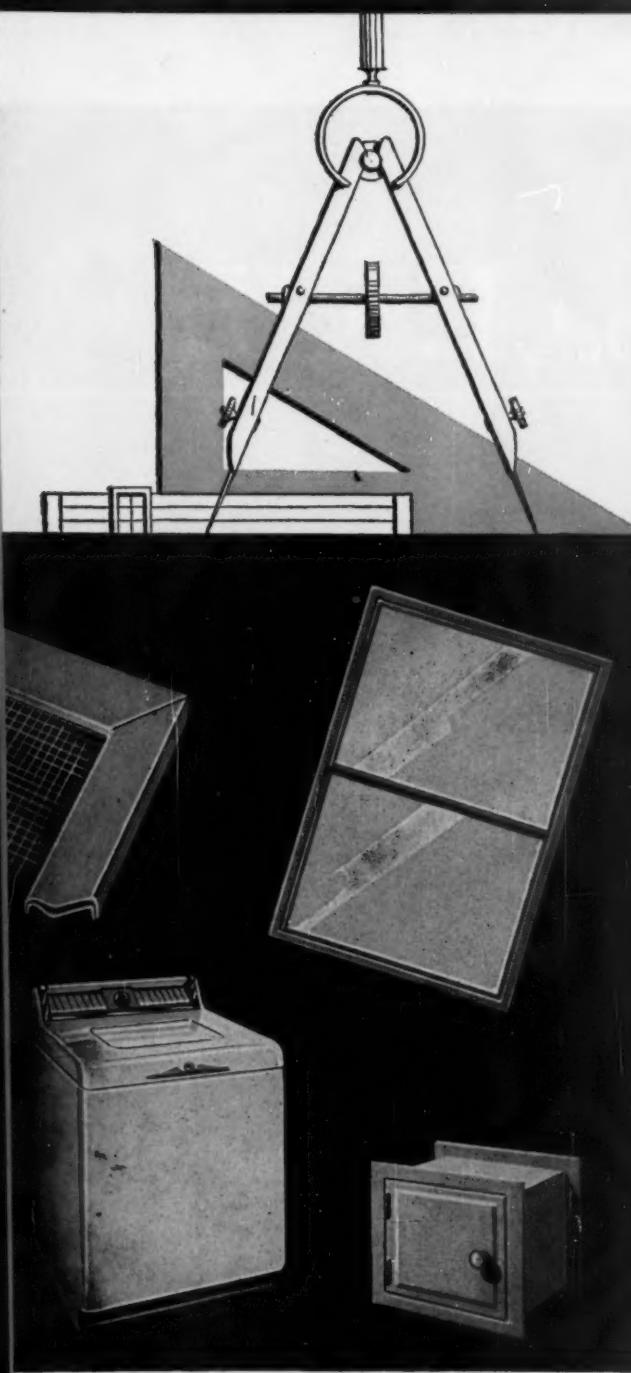
## MANHEIM

Manufacturing & Belting Co.  
408 Stiegel St., Manheim, Pa.

**"Industrial Belt Specialists Since 1911"**



© M.M.B. Co. 1956



put these bonus  
advantages of  
**WEIRKOTE**  
galvanized steel  
to work for you!

For appliances, for other steel products . . . when the job calls for galvanized steel, Weirkote does that job better.

Weirkote is made by a special continuous galvanizing process . . . and a tight zinc coating is applied. Result: Weirkote is resistant to peeling, cracking and flaking, even under the severest stresses of fabrication. The coating stays uniform, flows evenly with the base metal, and holds fast under the deepest draws. Amazingly corrosion-resistant, too!

These are just a few of Weirkote's bonuses in durability, economy, customer satisfaction. Make it a point to investigate Weirkote from Weirton! Remember: *In the long run, galvanized steel . . . in the LONGER run, WEIRKOTE.*



**WEIRTON STEEL COMPANY**

WEIRTON, WEST VIRGINIA

a division of

**NATIONAL STEEL CORPORATION**

# NEW *all-steel* ERIE



# RIGIDROP

*New design piston-lift gravity drop hammer with*  
New variable stroke control  
More guiding surface for closer-tolerance forgings  
Safety-streamlined, economical all steel construction

Experienced hammer operators will take quickly to the definite working advantages of this new Erie Rigidrop. It is a brand new concept in a simple-to-operate all-steel production hammer—striking more blows per minute, more easily, and with finer control than ever before realized. Certain shops will find this the most economical hammer they can use in their operations.

Most appreciated in Rigidrop's action is its ability to control stroke variation. This is not simply a short stroke feature, but a *new variable stroke control* allowing you to get *all the*

range of strokes between the conventional short and long. Its treadle operates as simply as the accelerator on your automobile—for short fast blows, just press lightly; for longer strokes, apply more foot pressure as desired. And... your operator can instantly shift from short strokes to longer, and shift back again just as quickly.

There are many more features of the Rigidrop which will appeal to cost-conscious shops. We'll gladly have an experienced Erie Foundry representative call on you to explain its application—just ask.

**Now available in sizes 1500 thru 5000 lbs., inclusive**

**40% more guiding surface**—New Erie guide arrangement provides more accurate guiding of ram and continued maintenance of die adjustment.

**Adjustable guides**—Guide-Ram adjustments easily made from front and back of Rigidrop at close-to-floor level. Ram can be removed from the hammer at die level, without jacking.

**Safety designed throughout**—No loose linkage, no

overhanging parts on the front of the Rigidrop. An air cushion head provides added protection if the hammer is overstroked.

**Built-in inching mechanism**—For easy die setups.

**Better clamping system**—Clamp faces are directly opposite one another to give positive clamping action without bending the rod.

**Minimum down time**—Never any board replacements.

SINCE 1895—THE GREATEST NAME

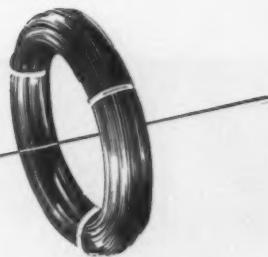


IN FORGING HAMMERS

**ERIE FOUNDRY CO. ERIE, PA.**



# wires that fish



In addition to wire for the traditional bent pins, CF&I-Wickwire makes a wire that's a real pro at fish catching. It's the special spring steel wire used to make fish hooks. Heat treated so it's soft and ductile, this high carbon steel wire can be severely deformed by fish hook makers, then heat treated again to give the finished hook a spring-like quality and hardness.

Chances are you don't need wire to make either pins or fish hooks. But *you may need one or more of the nearly 100 different categories of specialty wire for which CF&I-Wickwire is famous.* Let us show you how we can meet your most rigid chemical and physical specifications on high and low carbon wire in all sizes, shapes, tempers, finishes and grades.

## Check This List!

### FOR THE WIRE YOU REQUIRE, SEE CF&I-WICKWIRE.

#### FLAT AND SHAPED WIRES

Armor Wire  
Bobby Pin Wire  
Bookbinder Wire  
Brush Wire  
Casing Wire  
Cotton Pin Wire  
Curtain Spring Wire  
Die Spring Wire  
Guitar Broom Wire  
Lock Spring Steel  
Rake Tine Steel  
Regulator Spring Wire  
Snake Fishing Steel  
Stapling Wire for Preformed  
    Staples (Flat)

#### LOW CARBON FINE AND SPECIALTY WIRE

Bee Wire  
Bonnet Wire  
Bookbinder Wire  
Broom Wire  
Clip Wire  
Dent Spacer Wire  
Drapery Pin Wire  
Florist Wire  
Fuse Wire

#### Glass Netting Wire Hairpin Wire Hook and Eye Wire Mattress Wire Picture Cord Wire Picker Tooth Wire Pin Ticket Wire Pin Wire Ring Traveller Wire Spiral Binding Wire Stapling Wire Stapling Wire for Preformed     Staples Stone Wire Weaving Wire Weaving Wire for Fly Screen Cloth Wisco Iron Wire

Aircraft Cord Wire  
Armor Wire  
Belt Hook Wire  
Bobbin Ring Wire  
Brush Wire (Tempered and Un-  
    tempered)  
Brush Wire (High Strain)

#### Chrome Vanadium Spring Wire Core Wire (Aluminum Cable Steel     Reinforced)

Curtain Spring Wire  
Flexible Shaft Wire  
"Gamma" Spring Wire (Uphol-  
    stery Spring Wire)  
Zig Zag Wire  
No-Sag Wire  
Hat Wire  
Heddle Wire  
Hose Reinforcement Wire  
Hose Wire, Mechanical  
Hose Wire, Vacuum and Defroster  
Rope Wire  
Signal Corps Wire  
Spoke Wire  
Hard Drawn Spring Wire  
Oil Tempered Wire  
Spheroidized or Annealed Spring  
    Wire  
Tire Bead Wire  
Valve Spring Wire

MANUFACTURERS LOW  
CARBON COARSE WIRE  
Bag Tie Wire

Basket Handle Wire  
Box Binding Wire  
Brush Handle Wire  
"Cal-Tie" Wire  
Can Key Wire  
Case Hardened Ball Wire  
Chain Wire  
Clamp Wire  
Clothes Pin Wire  
Concrete Wall Reinforcement Wire  
Garment Hanger Wire  
Hay Baling Wire (Coiled)  
Lingo Wire  
Lintel Wire  
Loop Wire  
Merchant Quality Wire  
Pail Bail Wire  
Rivet Wire  
Stapling Wire  
Strand Wire  
Tying Wire  
Welding Wire  
Wisco Iron Wire  
Industrial Quality Wire  
Cold Rolling Quality Wire  
Heading, Forging or Roll Thread-  
    ing Quality Wire  
Medium High Carbon Wire

## CF&I-WICKWIRE WIRE THE COLORADO FUEL AND IRON CORPORATION

THE COLORADO FUEL AND IRON CORPORATION—Albuquerque • Amarillo • Billings • Boise • Butte • Casper  
Denver • El Paso • Ft. Worth • Houston • Kansas City • Lincoln (Neb.) • Oklahoma City • Phoenix  
Pueblo • Salt Lake City • Wichita • PACIFIC COAST DIVISION—Los Angeles • Oakland • Portland  
San Francisco • Seattle • Spokane • WICKWIRE SPENCER STEEL DIVISION—Atlanta • Boston • Buffalo  
Chicago • Detroit • New Orleans • New York • Philadelphia • CF&I OFFICE IN CANADA: Toronto  
CANADIAN REPRESENTATIVES AT: Calgary • Edmonton • Vancouver • Winnipeg



4240

At Scully-Jones and Co., Chicago:

## MACHINING COSTS GREATLY REDUCED



Here's how the Carboloy Machinability Computer showed Scully-Jones and Co., Chicago, how to reduce machining time 46% on a single job. Original operating standard for machining expanding shells called for 244 minutes per part. But by calculating the

optimum combination of speeds, feeds, and other data on the Computer, the company saved 48.8 minutes per part. The Computer was used to determine setups for both HSS and carbide tools . . . on turning, facing, drilling, and boring operations.

### Partial list of plants now using the Carboloy Machinability Computer:

Allied Products Corp.  
Armstrong Cork Company  
Beech Aircraft Corp.  
Bendix Aviation Corporation  
    Utica Division  
Bethlehem Steel Company, Inc.  
Boeing Airplane Company  
Bryant Chucking Grinder Co.  
Burroughs Corporation  
Caterpillar Tractor Company  
Chrysler Corp.  
    Airtemp Division  
The Cincinnati Shaper Co.  
Cone Automatic Machine Co., Inc.

DeLaval Steam Turbine Co.  
The DoALL Co.  
Fuller Company  
General Electric Company  
Gisholt Machine Company  
Goulds Pumps Inc.  
Greenfield Tap and Die Corporation  
    Geometric Tool Company Division  
Greenlee Bros. & Co.  
Houdaille Industries, Inc.  
    Buffalo Hydraulics Division  
Joy Manufacturing Company  
    Claremont Division

Ladish Co.  
The Maytag Company  
Mergenthaler Linotype Company  
Miehle Printing Press & Mfg. Co.  
Mueller Brass Co.  
The National Acme Company  
The New Britain Machine Co.  
    New Britain-Gridley Machine  
    Division  
Pachmayr Corp.  
Porter-Cable Machine Company  
Reed Roller Bit Co.  
Cleco Air Tools Division

The R. K. LeBlond Machine Tool Co.  
Rockwell Spring & Axle Co.  
    Blood Brothers Machine Division  
Ryan Aeronautical Company  
S. Morgan Smith Co.  
Standard Pressed Steel Co.  
Sundstrand Aviation  
    A Division of Sundstrand Machine  
    Tool Co.  
Thompson Products, Inc.  
Wagner Electric Corporation  
Westfield Metal Products Co., Inc.  
The Yale & Towne Manufacturing Co.  
Yale Materials Handling Division

# WITH CARBOLOY MACHINABILITY COMPUTER

- ▶ Determined most efficient cutting conditions
- ▶ Set up new operating standards in seconds
- ▶ Eliminated wasteful tryout runs, saved stock
- ▶ Saved 17 hours' machining time on a single job
- ▶ Provided closer control over machine downtime

Obtaining maximum production from their machines is now an easier matter for Scully-Jones and Co., Chicago. Machining data are fed into their Carboloy® Machinability Computer . . . and in seconds, optimum speeds, feeds, horsepower ratings, or any of 16 other operating variables are figured for the operator.

On the job at left, for example, the Computer showed how to cut machining time 46% on a 13-piece run . . . saving 17 machining hours, and eliminating wasteful, time-consuming tryout runs.

#### Benefits extend plant-wide

On other jobs throughout the plant, the Computer established new operating standards, corrected and verified existing ones. When necessary to improve tool life or production rate, the Computer determined new operating conditions in a fraction of the time previously required.

The advantages of the Carboloy Machinability Computer extend far beyond figur-

ing job setups. The Computer simplified inventory problems by predicting the rate of tool wear. It aided grinding rooms in planning work loads, and helped the plant superintendent coordinate production schedules.

The Carboloy Machinability Computer can be used by anyone with machining experience, after a short familiarization period. And, it can be a powerful educational tool by teaching operators how to improve production or reduce downtime through proper variations in operating conditions.

#### Ask for demonstration

The Machinability Computer is battery-operated, portable, and rugged. It is priced at \$495 (f.o.b. factory, Detroit).

For more information on how the Computer can help your plant increase production and reduce manpower costs, mail the coupon below. If you wish, we will gladly arrange a demonstration in your plant.

# CARBOLOY

CEMENTED CARBIDES

METALLURGICAL PRODUCTS DEPARTMENT OF GENERAL ELECTRIC COMPANY

11153 E. 8 Mile Blvd., Detroit 32, Michigan

- Please send more information on the Carboloy Machinability Computer.
- Have a representative make an appointment to demonstrate the Computer.

Name \_\_\_\_\_

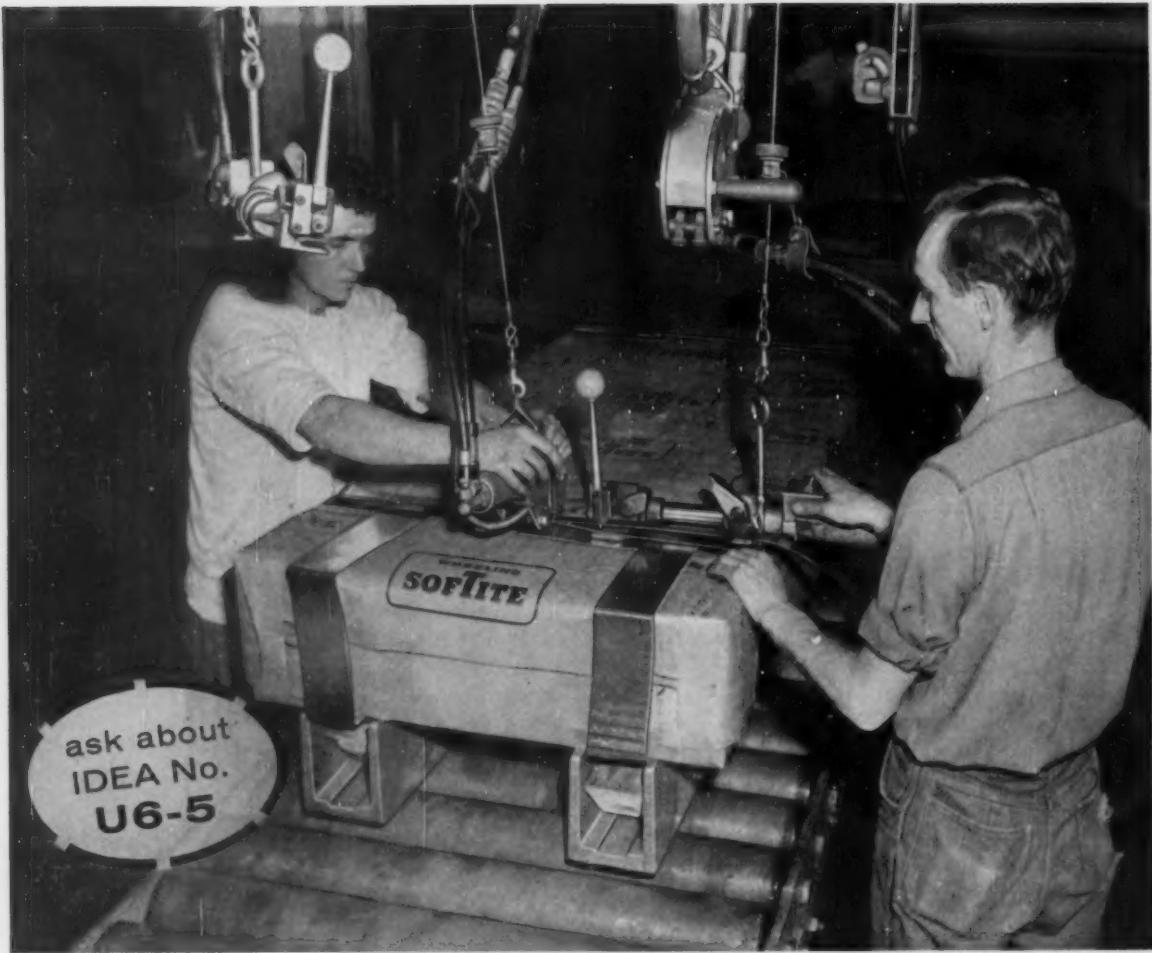
Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

"Carboloy" is a trademark of General Electric Company



**Rely on your AIM\*... Wheeling Steel did...  
Sheet steel packaging bottleneck eliminated**

**WHEELING STEEL** sought an idea for speeding up steel strapping of 7-10 thousand pound lifts of galvanized "Softite" sheet steel. Manual strapping output was low because of inconvenient methods of steel strapping lifts on floor and tables. Working with their Acme Idea Man, Wheeling Steel Corporation, Wheeling, West Va., developed a centralized conveyor line and steel strapping procedure (Idea No. U6-5).

Now, varying sizes of lifts move from prime piler to transportation without manual handling. Acme Steel hydraulic tools apply heavy duty steel strapping, tension, seal and cut.

The operation is safe, fast, economical and provides stable packages for shipping and storing. Operator fatigue is minimized. Packaging output is up more than 300% per shift.

\*Rely on your **Acme Idea Man** for help with your packaging and shipping problems. He will discuss practical material handling techniques and their application to your operations. Call him at your nearest Acme Steel office, or write: Dept. IFU-96, Acme Steel Products Division, Acme Steel Company, 2840 Archer Avenue, Chicago 8, Illinois. In Canada, Acme Steel Co. of Canada, Ltd., 743 Warden Ave., Toronto 13, Ont.

Acme Idea Man,  
R. F. Henkel  
helped Wheeling  
Steel build  
packaging  
output 300%.



**ACME  
STEEL** **STEEL STRAPPING**



## Want to net big grinding savings? Let Peninsular analyze your jobs



Grinding savings of both time and money often are hidden in unsuspected places. Peninsular Abrasive Engineers can quickly flush them into the open by making a comprehensive analysis of your complete operation. Their reports already have netted thousands of dollars a year for plants across the country.

For example, a semiautomatic machine stood idle for redressing after pointing only 8-10 high-speed drills. When Peninsular engineered a new wheel, production soared 400%, to 45-50 pieces between dressings, drastically cutting expensive downtime. In addition, wheel life increased 20%.

Call, write, or wire us today.

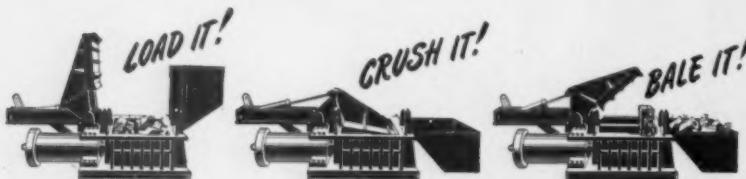
*Vitrified and Resinoid Grinding Wheels*

**PENINSULAR**  
GRINDING            WHEELS

PENINSULAR GRINDING WHEEL DIVISION—ABRASIVE AND METAL PRODUCTS COMPANY—DETROIT, MICHIGAN

# Now Dempster-Balester Presses offer you PUSH-BUTTON scrap metal baling!

ONE MAN can PUSH-BUTTON-OPERATE one or several Dempster-Balesters! One press may be the Dempster-Balester Model 129. Another the Model 351. Another the Model 701, etc. Each may be the same model, or there may be several of one model, one of another.



IN ADDITION, one or all may be fully equipped with exclusive Dempster-Balester Auxiliary-Compression Door that enables you to bale in a 1-2-3 continuous cycle (see LOAD IT, CRUSH IT, BALE IT illustrations above). This Auxiliary-Compression Door does not "beat" or "Tamp" the scrap. It actually penetrates into the charging box, hydraulically compressing the scrap with a 45-ton force.

PUSH-BUTTON  
PANEL

3



DO YOU NEED one Dempster-Balester or several? What model? With or without Auxiliary-Compression Door? With or without push-button control panel? Should your press produce one particular size bale, or be equipped to produce different size bales? Isn't it time we got together? Tremendous savings are yours with the right press, properly engineered and equipped to meet your particular requirements. Ask us to give you complete information. *A product of Dempster Brothers, Inc. Sold in Canada by the W. P. Favorite Co., Ltd., 418 Main Street East, Hamilton, Ontario.*

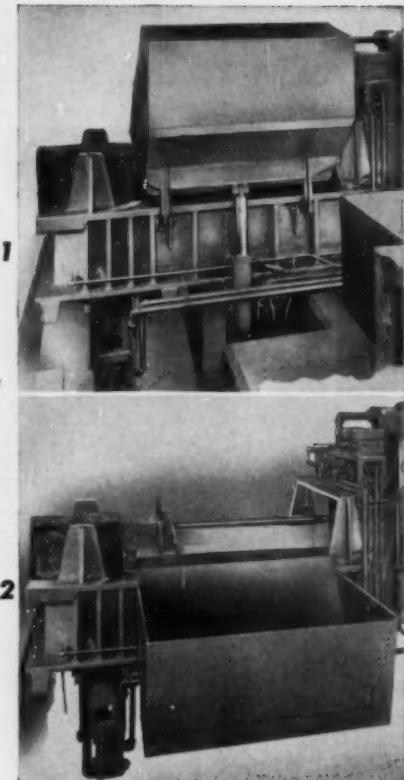


Photo 1 shows push-button controlled Skip Pan dumping load into charging box. Skip Pan returns to be re-loaded and (Photo 2) Charging Box Door moves out, pushing last bale forward, clear of charging box. Bale ejector returns to lowered position. Fusher rams proceed to bale the scrap and then automatically retract. Charging Box Door opens (see Photo 3), bale is ejected and Skip Pan, which has been re-loaded, is ready to dump another load into box for baling.

**DEMPSTER  
BALESTER®**

**DEMPSTER BROTHERS, 496 N. Knox, Knoxville 17, Tennessee**

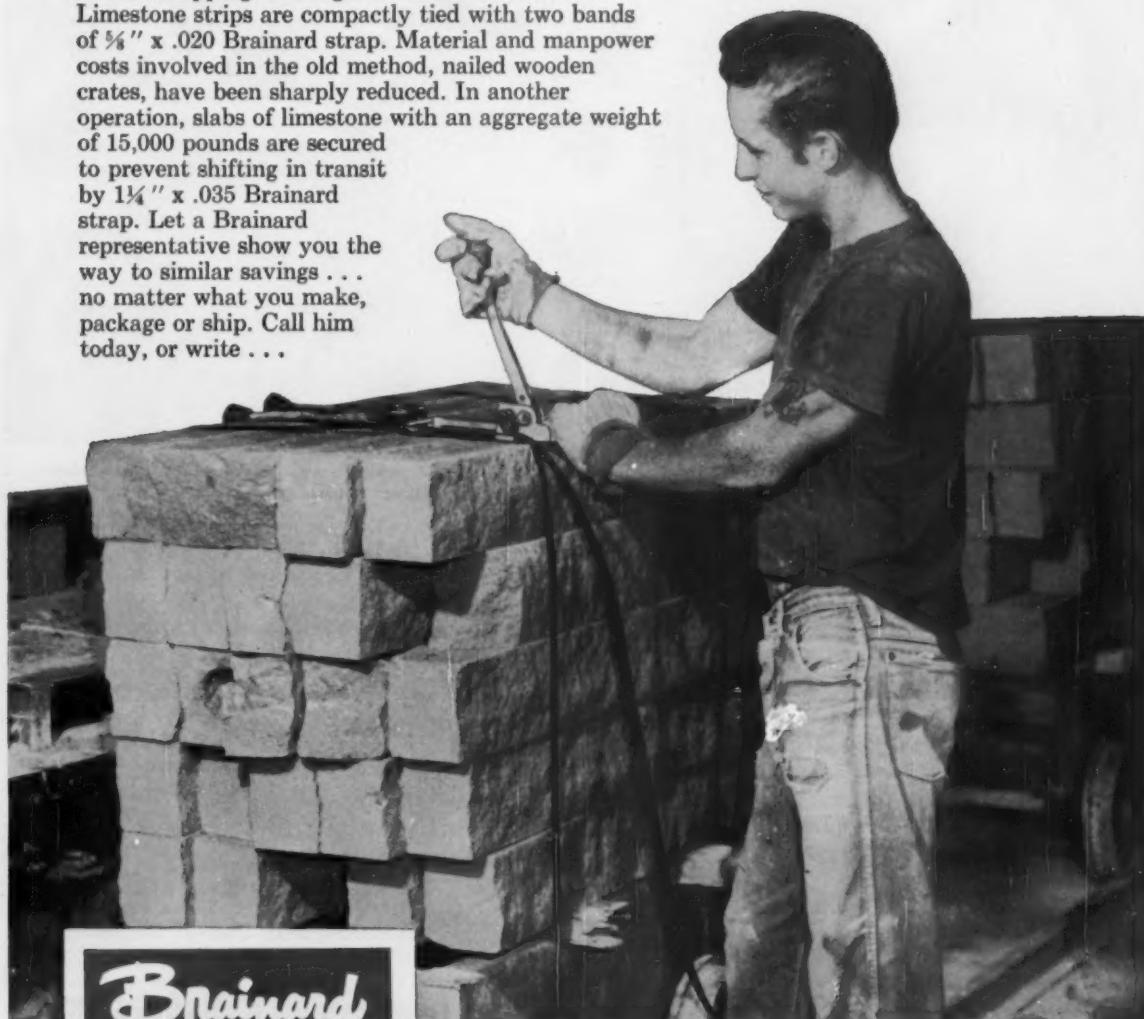
**How**

## **BRAINARD STRAPPING SERVICE**

***slashed building stone  
handling costs 50%***

With the help of Lew Dickson, a Brainard strapping expert, Empire Stone Co., Bloomington, Indiana, reduced limestone handling costs by more than 50% . . . cut shipping breakage to a minimum.

Limestone strips are compactly tied with two bands of  $\frac{1}{8}$ " x .020 Brainard strap. Material and manpower costs involved in the old method, nailed wooden crates, have been sharply reduced. In another operation, slabs of limestone with an aggregate weight of 15,000 pounds are secured to prevent shifting in transit by  $1\frac{1}{4}$ " x .035 Brainard strap. Let a Brainard representative show you the way to similar savings . . . no matter what you make, package or ship. Call him today, or write . . .



**Brainard**

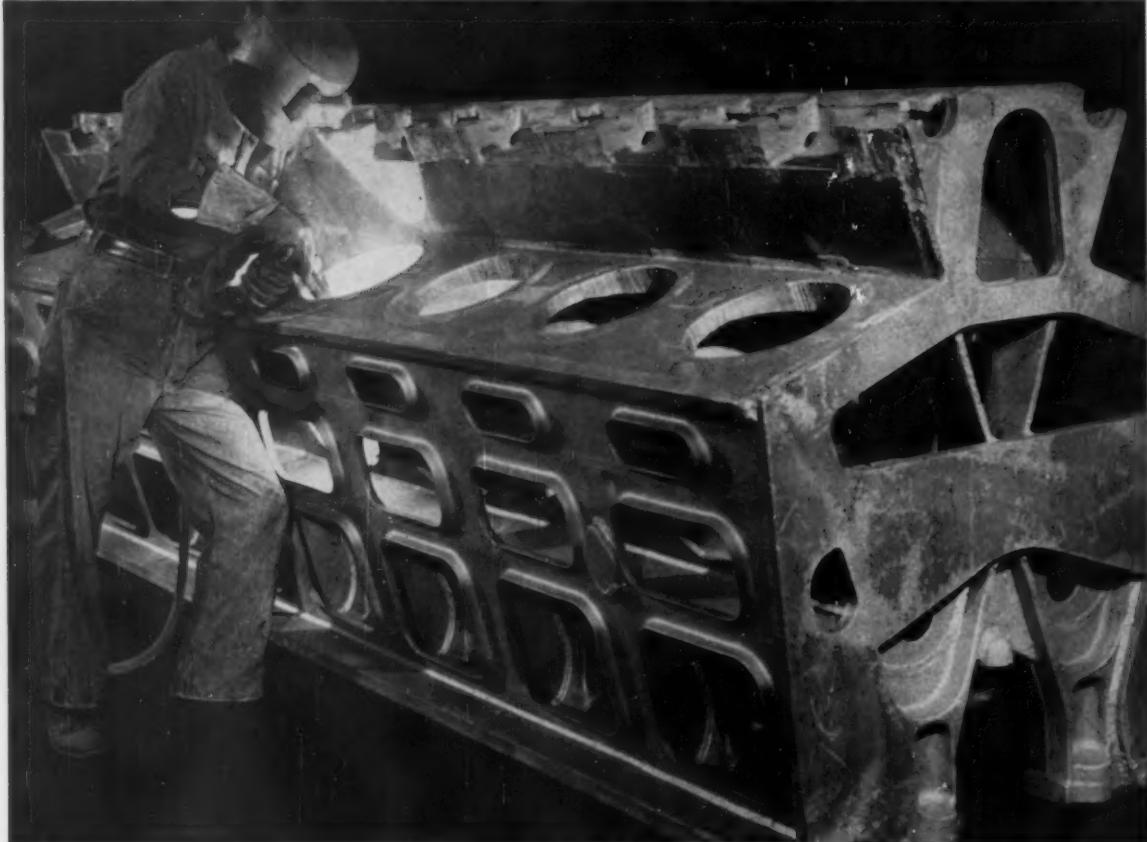
SHARONSTEEL

STEEL DIVISION  
SHARON STEEL CORPORATION

**THE BRAINARD STEEL DIVISION**

of the Sharon Steel Corporation  
Dept. I-9, Griswold Street, Warren, Ohio  
MAKERS OF QUALITY STEEL STRAPPING

WELDMENTS for strength, lightness, predictability and design freedom—at lower cost!



**DIESEL ENGINE FRAME:** Weldments of this type have been responsible for weight savings as high as 32% with no sacrifice in strength

and safety. Superior shock resistance protects engine performance. Maintenance costs are reduced and significant economies realized.

## HERE'S THE STORY OF QUALITY BEHIND EVERY LUKENWELD WELDMENT

Lukenweld's extensive production facilities and experience add up to this: no matter how big, tough, or challenging the job, you get exactly what you want—on time—and at a cost that will fit your plans.

**DEPENDABILITY** The predictability and rigidity of welded structures plus Lukenweld's specialized knowledge of design and materials selection assures equipment that will perform efficiently, longer.

**RELIABLE SOURCE OF MATERIALS** Carbon, alloy and clad steel plates in the widest range of types and sizes available anywhere are obtainable "right next door"—from the Lukens rolling mills.

**CONSULTATION SERVICE** Metallurgical, design engineering, related services are available on your job.

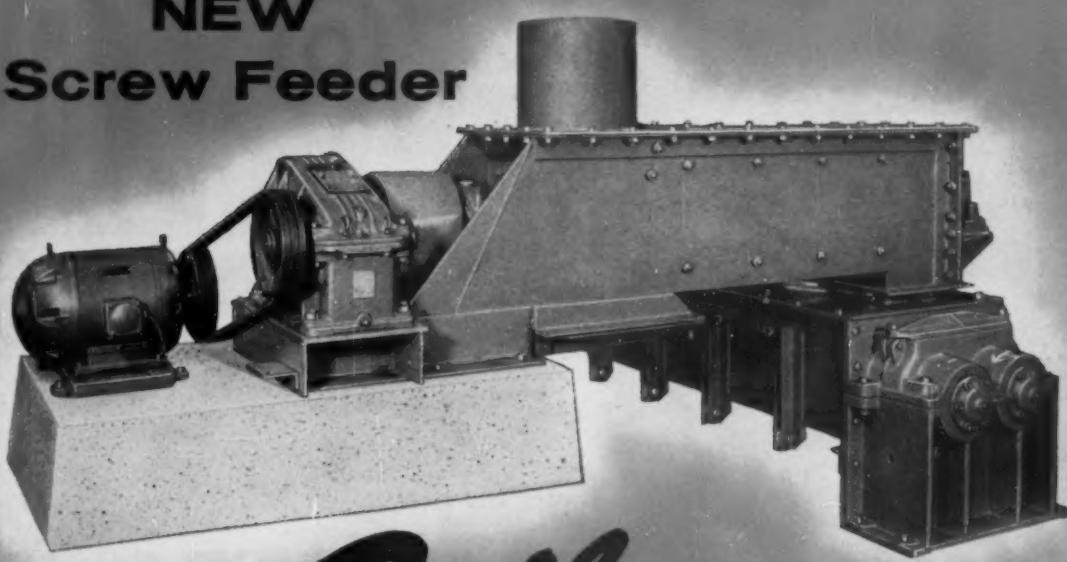
**FINISHING FACILITIES** Modern heat treating, machining and other finishing facilities are your assurance of complete quality control from steel plate to finished weldment—ready for assembly in your equipment.

**EXPERIENCE** Lukenweld, the first commercial weldery in the U.S., pioneered many advances in welded construction. Knowledge and craftsmanship gained through this experience make Lukenweld unusually qualified to meet your weldment needs.

**FOR INFORMATION** on how Lukenweld can answer your particular weldment problems or for a copy of the informative booklet, "Weldments by Lukenweld," write on your company letterhead to Manager, Marketing Service, 819 Lukens Building, Coatesville, Pa.

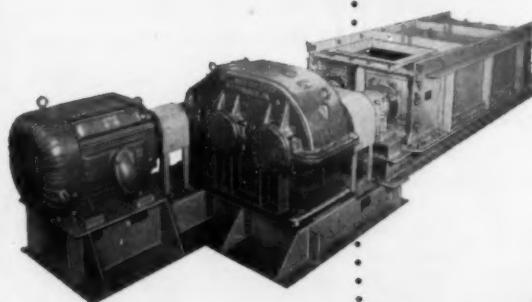
**LUKENWELD**   
A DIVISION OF LUKENS STEEL COMPANY  
COATESVILLE, PENNSYLVANIA

## NEW Screw Feeder



MAKES **Bailey**  
**PUG MILLS**

### EVEN MORE EFFECTIVE IN SINTERING PLANT AND BLAST FURNACE DUST CATCHER SERVICE



This Bailey Double Shaft Pug Mill is equipped with a double helical gear reduction unit. Types of Bailey Pug Mills available include single and double shaft types, with direct or rope drives.

The new Bailey Screw Feeder is effective for flow regulation and conveying of flue dust, ore fines and various other materials. An outstanding feature is that it maintains uniform flow, even when irregular feeding may be caused by "hanging" of material in dust catcher or a sudden furnace "slip." The feeder speeds the sintering process and assures substantial savings through reduced handling costs.

BAILEY PUG MILLS were developed for low-cost processing of greater tonnages of more uniform sintered products. They are built for continuous service, in capacities from 100 to 400 tons per hour.

**Write for Bulletins**





The Metal Man says:

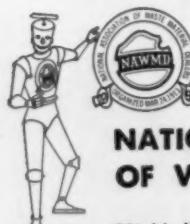
## **"TO PLANTS LIKE THIS, I BRING INCREASED METAL SCRAP INCOME!"**

Have you met the Metal Man? He is the symbol adopted by the Metal Dealers Division of the NAWMD . . . the symbol of reliability, profitable counsel and outstanding service.

As a generator or consumer of non-ferrous scrap, it will pay you to "look for the Metal Man" . . . or in other words, consult a NAWMD member dealer. As a leader in his industry, his wide scope of activity equips him to provide you with valuable assistance in setting up the most profitable methods of scrap recovery.

"Look for the Metal Man" to protect your company's interests. You save time and trouble, and your firm's metal scrap income . . . often a significant part of profits . . . goes *UP!*

*For counsel on non-ferrous metal scrap, be  
sure to consult a NAWMD member dealer*



**METAL DEALERS DIVISION**

*"Always look for this seal"*

**NATIONAL ASSOCIATION  
OF WASTE MATERIAL DEALERS**

271 Madison Ave.

New York, N.Y.

You get what you want with

# DANLY

## MASTER MECHANIC

Ever wish you could build your own presses? Danly does it for you... putting in the same extra strength you would to avoid down-time, working to closer tolerances as you would to protect your dies.

Danly Presses are built the way you want them. Take Danly's lubrication system, for instance... it's automatic to safeguard the press against human error and protects vital wear surfaces with oil to assure longer life.

You get what you want with Danly Presses.

DANLY MACHINE SPECIALTIES, INC.  
2100 So. Laramie Ave. • Chicago 50 • Ill.

Ask for your copy of *The Danly "Press Catalog"*... It gives the whole story on how Danly Presses are built for you. Write today.



# DANLY

®

You can acquire a new 4" Table Type machine for as little as \$1.71 an hour, if you operate two 40-hour shifts, by using Gilbert's new financing plan: 6% simple interest (3% add on), up to 5 years to pay. (These prices are subject to change.) 3½" and 5½" Table Type machines cost even less to own.



**new 4" and 5"**

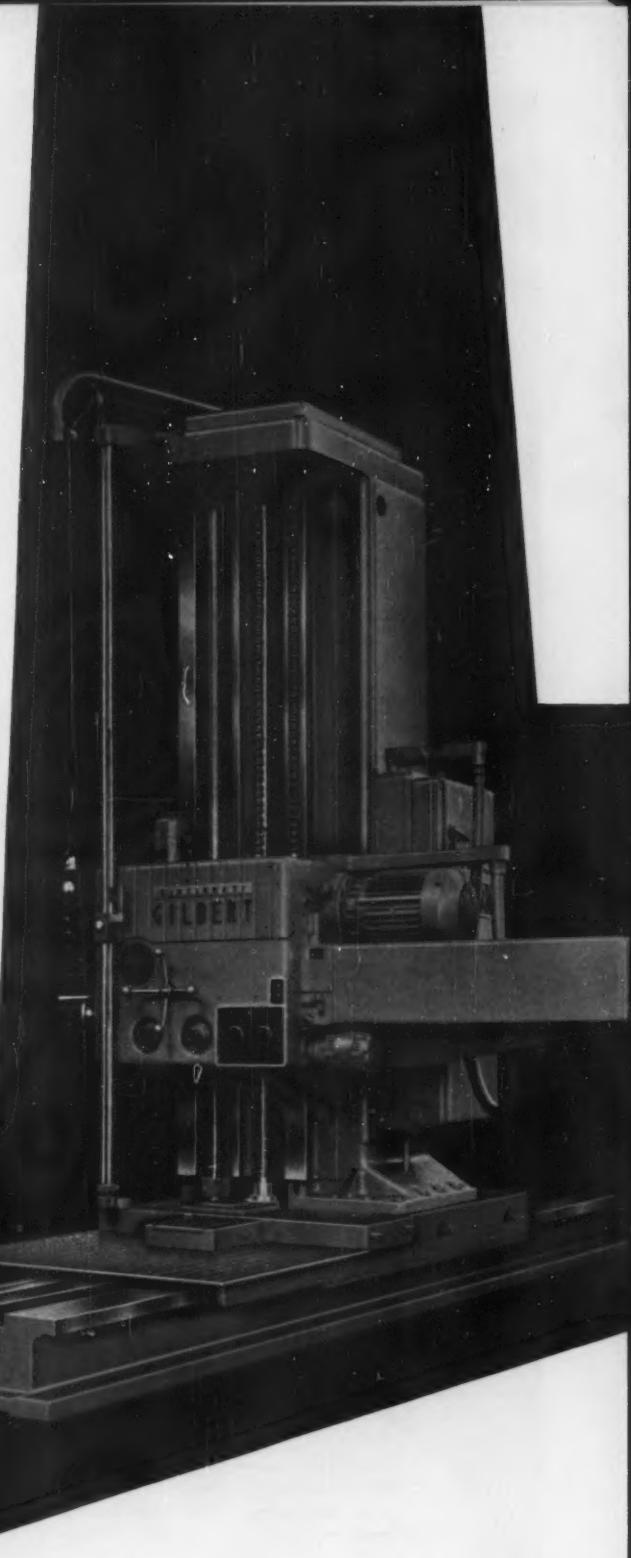
Every modern feature that can reduce floor-to-floor time is built into these new Gilbert 4" and 5" boring mills.

For one example, your operator can pre-select speeds and feeds, and power automatic shifting takes over from there. For another, the pushbutton station makes his job easier and reduces his machine-handling time. This controls start, stop, and reverse for spindle; spindle electric clutch and brake; reverse for all feeds; forward, reverse power rapid traverse; spindle and milling feeds and rapid traverse; back gear clutch on spindle sleeve; milling feeds to head, table, and saddle (table type), or head and column (floor type); spindle feed electric clutch; power clamp, head to column (table type) or to head and base-to-runway (floor type); and automatic positioning, if ordered.

The built-in reversible motor (up to 20 hp) on the head puts maximum power to the tool; there are no long drive shafts. Speeds up to 1,500 rpm are standard.

*The Cincinnati Gilbert Machine Tool Co.  
3366 Beekman Street, Cincinnati 23, Ohio*

*those who buy*  
**GILBERT**  
*buy Gilbert again*



boring mills

# PROFIT!

## National Metal Exposition And Congress

PUBLIC HALL  
CLEVELAND, OHIO

Oct.  
8 thru 12

### OWNERS AND MANAGERS

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National Metal Exposition      Metals Engineering Institute  
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Metals Handbook      Technical Books

You'll earn and learn much more than the cost of your visit to the Metal Show.

You'll see nearly 500 exhibits showing the most modern and cost-cutting ideas in the metals field. It'll be like a grand tour of the metals industry, which would take months to see in any other way.

You'll learn profitable ideas that will contribute to your future planning in many important ways. That's why this year's Metal Show is a must for management men, engineers, production and purchasing men in your plant . . . in fact, anyone you know who is concerned with metals should see this show and sit

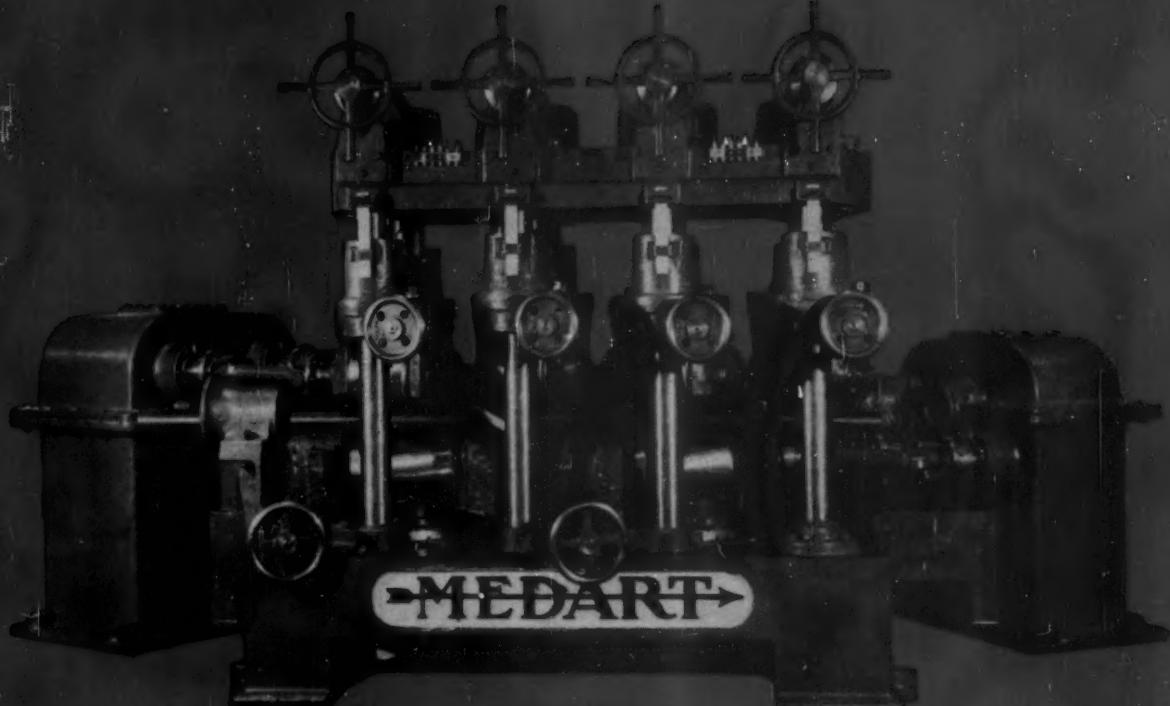
in on the sessions. **MORE THAN 100 TECHNICAL PAPERS** are scheduled. Specialists will discuss their most recent findings. They will tell you what's new and coming in the metals field and how you can profit most from these modern achievements.

For the ideas you'll gain . . . for greater profit in the future . . . for all you'll see and learn . . . attend the 1956 Metal Show at Cleveland's Public Hall.



AMERICAN SOCIETY FOR METALS  
7301 EUCLID AVE. • CLEVELAND 3, OHIO





***BLAW-KNOX MEDART makes what it takes***  
***for high speed, Multiroll Tube straightening***

Developed to meet the requirements of pipe and tube mills, the Blaw-Knox Medart Multicycle Rotary Straightener delivers high speed precision straightening of pipe and tubular products. It differs from other six roll machines in that the sixth roll is also a straightening or bending roll. In conjunction with the middle bending roll, it imposes a duplex straightening cycle on the workpiece.

Unbalanced torque on the workpiece is eliminated since all four feed rolls are driven from a single motor. This insures positive, synchronized feed and torque balance. What's more, this application of balanced torque permits thin wall tubular straightening not possible with other types of machines. Delivery speed is limited only by the condition and properties of the work-

piece which may limit the torque and pressure applied.

The Blaw-Knox Medart Multicycle Rotary Straightener is available in all sizes for handling materials in diameters ranging from  $\frac{1}{4}$ " to 18". Larger sizes will be designed upon request.

Contact us at any time for detailed information, technical assistance or service.



**BLAW-KNOX COMPANY**  
*Foundry and Mill Machinery Division*  
 Blaw-Knox Building • 300 Sixth Avenue  
 Pittsburgh 22, Pennsylvania



# Two of America's Most Modern

## 22 BLISS HYDRO-DYNAMIC PRESSES WORK FOR BOTH ARMY AND NAVY AT EKCO PRODUCTS

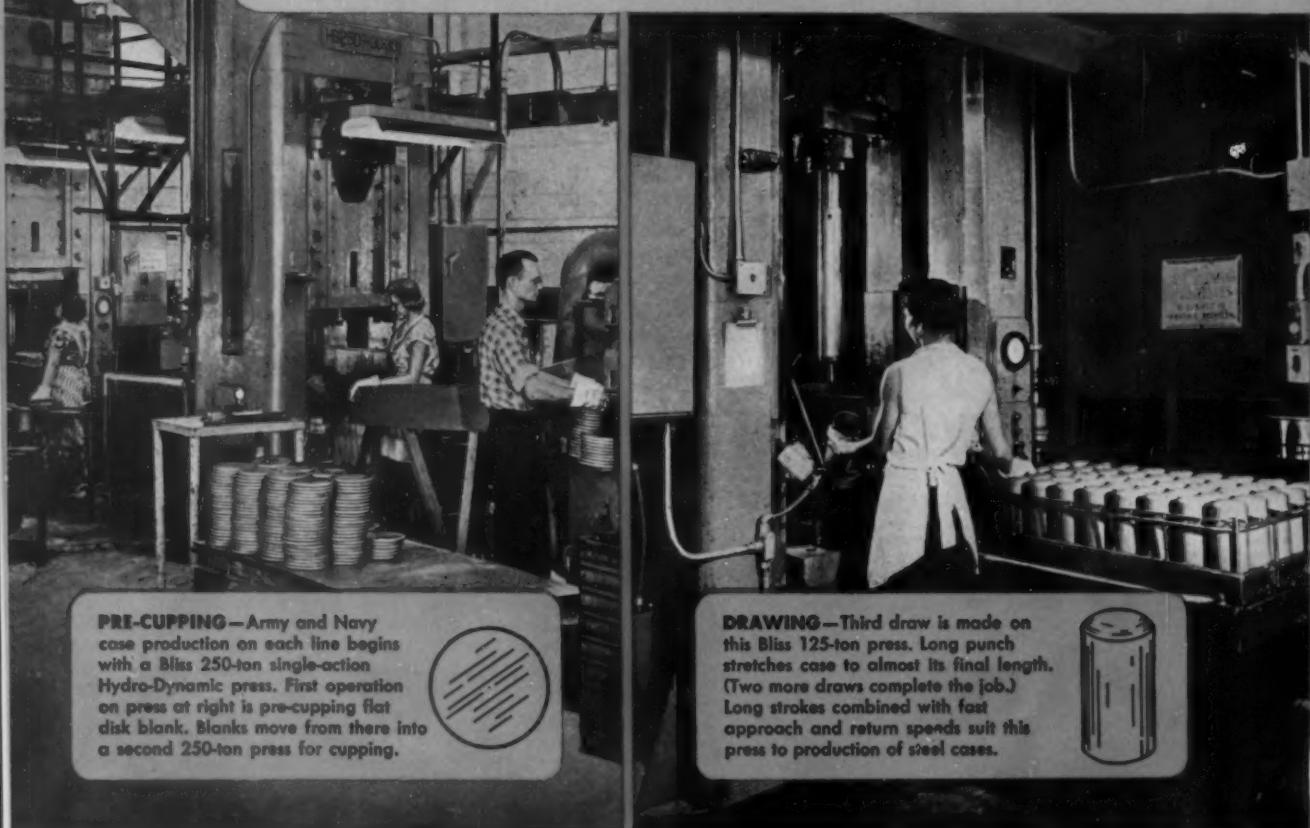
At Ekco Products Company, Chicago, one line of Bliss presses ranging from 75 to 2500 tons produces 76 mm cartridge cases...and another line of eleven makes 3"/50 Navy cases.

The speed at which the lines are operated is "classified" information, but you may be sure it is exceptionally fast. As a matter of fact, their performance so exceeded their original "specs" that the lines have become known throughout the ordnance world.

Press operations on both lines are the same—a series of eleven steps beginning with pre-cupping a steel blank, then cup, four draws, pre-head, final draw, heading, and two tapering operations. Only difference between the Army and the Navy lines is a slight variance in tapering techniques.

Designing and building entire ordnance lines, both hydraulic and mechanical, has been a specialty of Bliss since Spanish-American War days. Today, Bliss press lines are as common throughout ordnance as they are throughout industry at large.

If you have a pressed metal problem, put this experience to work—let Bliss help you pick the one right press—or press line—for the job.



**PRE-CUPPING**—Army and Navy case production on each line begins with a Bliss 250-ton single-action Hydro-Dynamic press. First operation on press at right is pre-cupping flat disk blank. Blanks move from there into a second 250-ton press for cupping.

**DRAWING**—Third draw is made on this Bliss 125-ton press. Long punch stretches case to almost its final length. (Two more draws complete the job.) Long strokes combined with fast approach and return speeds suit this press to production of steel cases.



**BLISS**  
SINCE 1857

*is more than a name... it's a guarantee*

**E. W. BLISS COMPANY, Canton, Ohio**  
Presses, Rolling Mills, Rolls, Special Machinery

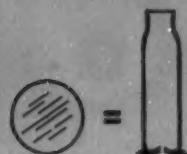
# Steel Cartridge Case Lines



## Eleven Press Operations On Each Line



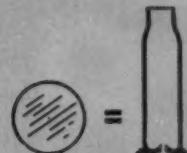
ARMY



From this...to this

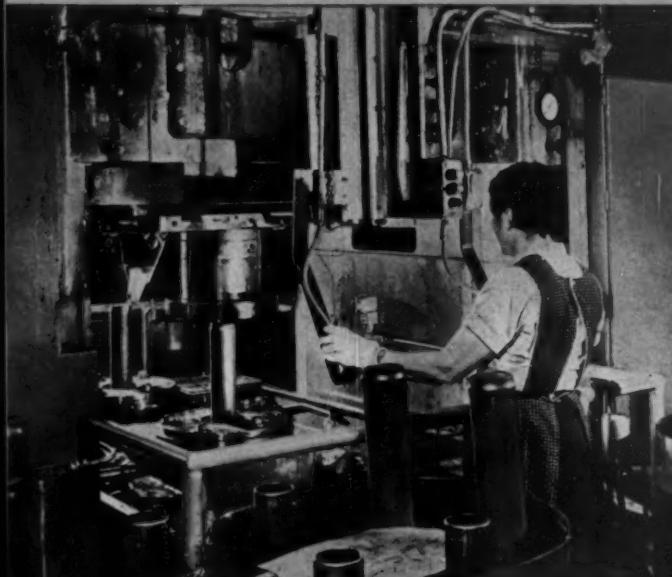


NAVY

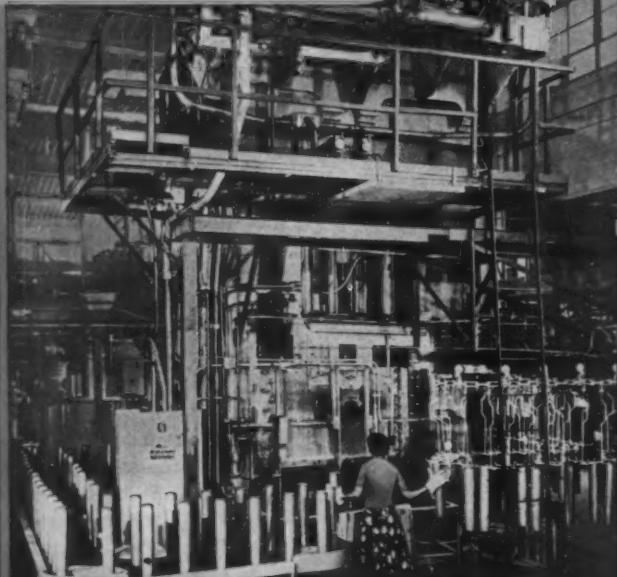


From this...to this

OPERATION	PRESS	CAPACITY
1. Pre-Cup	Bliss HS250	250
2. Cup	Bliss HS250	250
3. First Draw	Bliss HS200	200
4. Second Draw	Bliss HS150	150
5. Third Draw	Bliss HS125	125
6. Fourth Draw	Bliss HS100	100
7. Pre-Head	Bliss HS1500	1500
8. Fifth Draw	Bliss HS75	75
9. Head	Bliss HS2500	2500
10. First Taper	Bliss HS75	75
11. Second Taper	Bliss HS75	75



**PRE-HEADING**—This 1500-ton press, which pre-heads cases, is equipped with a Bliss-designed shuttle, allowing it to be loaded with one case while another is still in the press. Shuttle makes it easier to load and unload thus speeding production.



**HEADING**—Heaviest press in each line is a Bliss 2500-ton heading press. Large pumps on top provide smooth flow of high pressure oil to the slide. Pumps are simple and rugged, with peak rating well above maximum press tonnage.



**U. S. Plants:** Canton, Cleveland, Salem and Toledo, Ohio; Detroit and Hastings, Michigan; San Jose, California, Midland and Pittsburgh, Pa. **Branch Offices:** Boston, Burbank, Chicago, Cleveland, Dayton, Detroit, Indianapolis, New Haven, New York, Pittsburgh, Philadelphia, Rochester, Salem, San Jose, Toledo, Washington, D. C. and Toronto, Canada; E. W. Bliss (England) Ltd., Derby, E. W. Bliss Co., (Paris), France. Other representatives throughout the world.

For increased d-c power...



N. W. Geist, Rectifier Department Sales Manager, presents one of the new, sealed Ignitron rectifiers, now available in greatly extended ranges. It is the same type used in this metal-enclosed rectifier unit, rated at 1500 kw, 250 volts, for steel mill service.

## NOW! GET WESTINGHOUSE SEALED IGNITRONS IN HIGHER RATINGS, COMPLETELY ENCLOSED UNITS

You can now get d-c power conversion for *any* application with the new, higher rated Westinghouse sealed Ignitron rectifiers. These Ignitrons, through the entire load range, have a clear-cut efficiency advantage over other forms of conversion equipment.

Westinghouse sealed Ignitrons are basically simple . . . there are no major moving parts; all vacuum connections and indicating equipment have been eliminated. Here is a big bonus in less maintenance, lower operating cost. Tubes are permanently sealed at the factory; replacements can be obtained without delay from stock, insuring a minimum of outage time. Ignitron

cubicles are completely preassembled and wired—ready for installation upon delivery.

As a Westinghouse unit substation—with associated dry-type or liquid-filled transformers and a-c and d-c switchgear—the new Ignitron rectifiers are more compact, *require less floor space per kw*, than any other conversion equipment. And, with the grounded, dead-front metal enclosure, all personnel hazards are eliminated.

For further data, call your Westinghouse sales engineer, or write to Westinghouse Electric Corporation, Box 868, 3 Gateway Center, Pittsburgh 30, Pa.

J-10443

YOU CAN BE SURE... IF IT'S  
**Westinghouse**

54 YEARS OF DESIGNING AND BUILDING EQUIPMENT



One section of Aetna-Standard's big engineering staff

## men at work for ONE PURPOSE

To develop better equipment and more efficient equipment for production of steel, copper, brass, aluminum, in the form of higher quality pipe and tubing, tin plate, galvanized sheet and strip, cold drawn bars and tubes and many other products.

These engineering **idea men** have one purpose — to transform ideas into equipment as exemplified by the Rotary Hot Saw, the Tube Expander, the 5-Draw Draw-

bench and many ideas of Continuous Galvanizing, Continuous Electrolytic Tinning and Finishing Equipment.

They do not work alone. Many of the ideas for new equipment originate with you, the customer. The Aetna engineering idea staff refines and develops the idea into equipment. This ability to work with customers is one of Aetna's best assets. . . . That's why Aetna-Standard always has been known as the **idea people**.

# AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA.

PLANTS: ELLWOOD CITY, PA., WARREN, OHIO

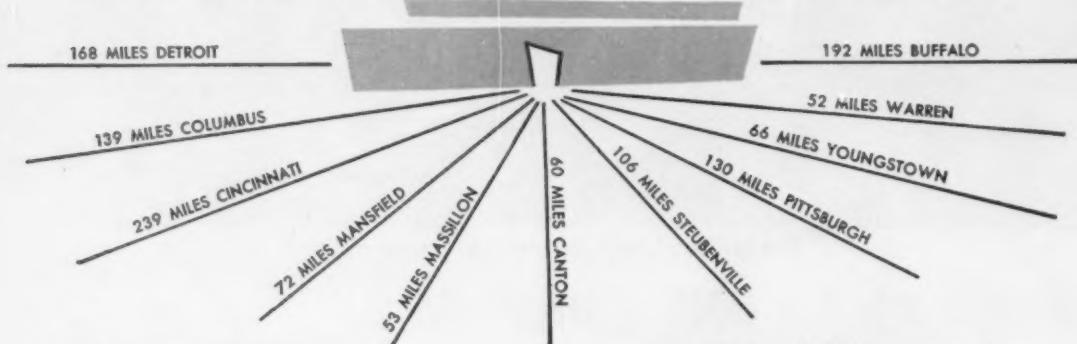
CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC



AN EASY TRIP FROM MOST LOCATIONS—GO SEE!

## THE 1956 IRON & STEEL EXPOSITION

CLEVELAND PUBLIC AUDITORIUM SEPT. 25-28!



### ★ TELL-ALL EXHIBITS

More than 200 companies that supply materials, equipment and services to the Steel Producing Industry will reveal their latest advances in eye-catching, informative displays and demonstrations.

### ★ IMPORTANT TECHNICAL SESSIONS

Four full days of intensive technical sessions offer a liberal education in "What's New" in steel plant operation, methods, planning, maintenance and many other pertinent subjects.

## IRON AND STEEL EXPOSITION

*The Industry's Most Specific Show!*

For additional information, write

Association of Iron & Steel Engineers, 1010 Empire Bldg., Pittsburgh 22, Pa.

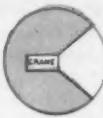
# FASTER and SAFER crane operation

with BROWNHOIST  
patented monitor type  
cab and clear vision  
boom



Windows on all sides of the raised Monitor Type Cab of a Brownhoist Locomotive Crane give the operator a full view of the area in which he is working, and the open type Clear Vision Boom lets him look right down at the work itself. This complete 360° visibility—to the sides, to the rear, and forward into the car—allows the operator to work more rapidly, without unnecessary crane swinging, and also increases safety by eliminating blind spots. The patented Monitor Type Cab has a door on each side, and all doors and windows can be opened for ventilation. A soundproof partition separates the operator from the engine and controls are placed within convenient reach of his adjustable seat. These factors assure ease of operation of the Brownhoist Locomotive Crane, and Brownhoist engineering assures maximum performance. Anti-friction bearings are used throughout including machinery side frames. The boom hoist is worm driven for smooth, safe operation. Dynamic clutches disconnect all upperworks when travelling . . . give sure, positive control. High strength alloy steels bulwark the machine for heavy service. Throughout, Brownhoist Locomotive Cranes are designed and built for high capacity production. For further information write today for Catalog No. 548.

Approximate  
visibility from  
ordinary cab.



Approximate  
visibility from  
side-operated  
cab.



360° visibility  
from I. B. pat-  
ented Monitor  
Type Cab.



Your operator can see exactly what he's work-  
ing with in the car in front of him. Greater safety  
is the result.

188

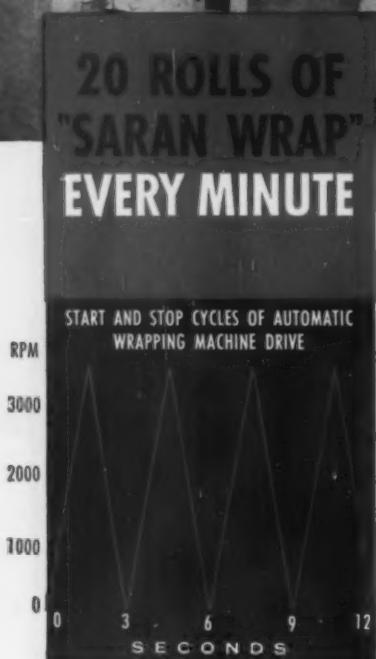
BROWNHOIST MATERIALS  
HANDLING EQUIPMENT  
GIVES A LIFT TO  
AMERICAN INDUSTRY



INDUSTRIAL BROWNHOIST CORPORATION  
BAY CITY, MICHIGAN • DISTRICT OFFICES: New York,  
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Montreal • AGENCIES: Detroit, Birmingham, Houston

SUBSIDIARY OF





The Dow Chemical Company's production of "Saran Wrap" has leaped from 130,000 rolls to 4,000,000 rolls a month since 1951. This up-swing is due to a new plant, a new flow system, and additional equipment including new machinery equipped with Reliance V★S Drives.

One of the most dramatic applications of V★S Drives is on the final wrapping machines shown here. The drives must be able to start, accelerate to 3500 rpm., and stop more than 20 times a minute.

The most important feature, though, is not the frequent starts and stops, but the delicately controlled acceleration of the drives. "Saran Wrap" is only 1/6th as thick as a human hair, and sharp or jerky starts will cause a break in the sheet and halt production. Reliance Drives do the job day in and day out without a single break due to uncontrolled acceleration.

This feature of V★S Drives, called *Dynamic Response*, is only one of the many facets of Reliance Drives. V★S Drives can regulate tension, synchronize operations, control speed rates, and automatically program speed changes.

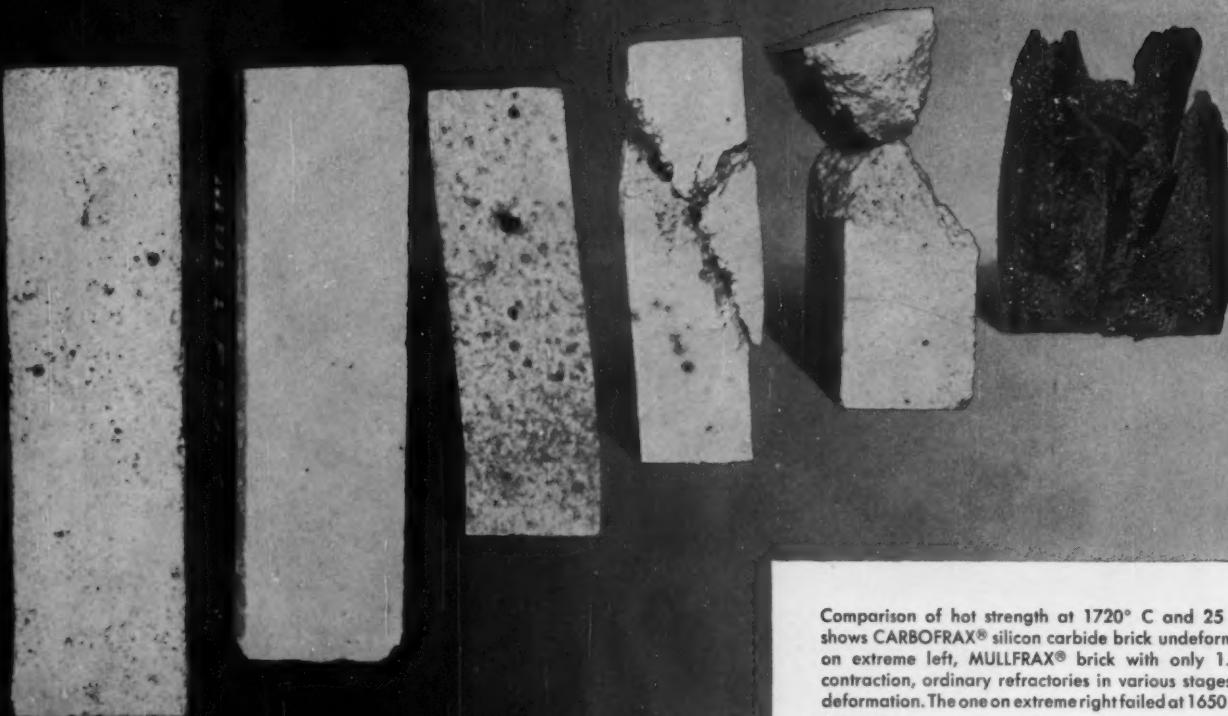
Whether you handle a thin film of plastic or steel billets, on a complete production line or a single machine, Reliance can give you better quality, more production, and lower costs through Variable Speed Drives.

D-1508

Write for bulletin D-2311.

**RELIANCE** ELECTRIC AND  
ENGINEERING CO.

DEPT. 29A, CLEVELAND 10, OHIO • CANADIAN DIVISION: WELLAND, ONTARIO  
Sales Offices and Distributors in Principal Cities



Comparison of hot strength at 1720° C and 25 psi shows CARBOFRAX® silicon carbide brick undeformed on extreme left, MULLFRAX® brick with only 1.4% contraction, ordinary refractories in various stages of deformation. The one on extreme right failed at 1650° C.

*fifth in a series...*

#### HOT STRENGTH

## Unusual Properties of Refractory Materials

**Hot Strength**—When load is applied to a refractory its ability to resist heat is lessened. Increasing either load or temperature, or both, often causes the refractory to fail.

As these factors are combined in most installations — large and small — hot strength of a refractory takes on new value.

The effect of temperature in combination with load is shown by specimens pictured above. Further tests provided these data: In a test under 50 psi, a MULLFRAX® electric furnace mullite brick showed no linear contraction when held at 1500°C for 100 hours. Ordinary brick contracted an average of 7.58% at 1500°C but that at only 35 psi. In another typical case complete failure (15% contraction) was experienced with a commonly used refractory at 1350°C and a load of 25 psi.

These differences in hot strength prove this: Where refractories fail under load and temperature, Carborundum refractories have the *extra* resistance needed to avoid slumping and, thereby, to effect less downtime, lowered maintenance costs and greater output.

Hot strength may work in another way, too. It permits use of thinner section refractories, thus reducing overall load. More insulation may be used to lower heat losses.

Carborundum's magazine "Refractories" pinpoints many practical applications for these unusual products. The next issue carries a feature article on "hot strength". Send for your copy today.

#### VALUABLE INFORMATION FOR USERS OF:

REFRACTORIES • CASTABLE CEMENTS • POROUS PLATES AND TUBES

CATALYST SUPPORTS • OXIDE, BORIDE, NITRIDE AND CARBIDE

HIGH-TEMPERATURE MATERIALS • CERAMIC FIBER

*all in the new magazine "Refractories"*

#### MAIL THIS COUPON TODAY

Dept. B96, Refractories Division

The Carborundum Company, Perth Amboy, N. J.

Please send me the forthcoming issue of "Refractories".

Name \_\_\_\_\_ Title \_\_\_\_\_

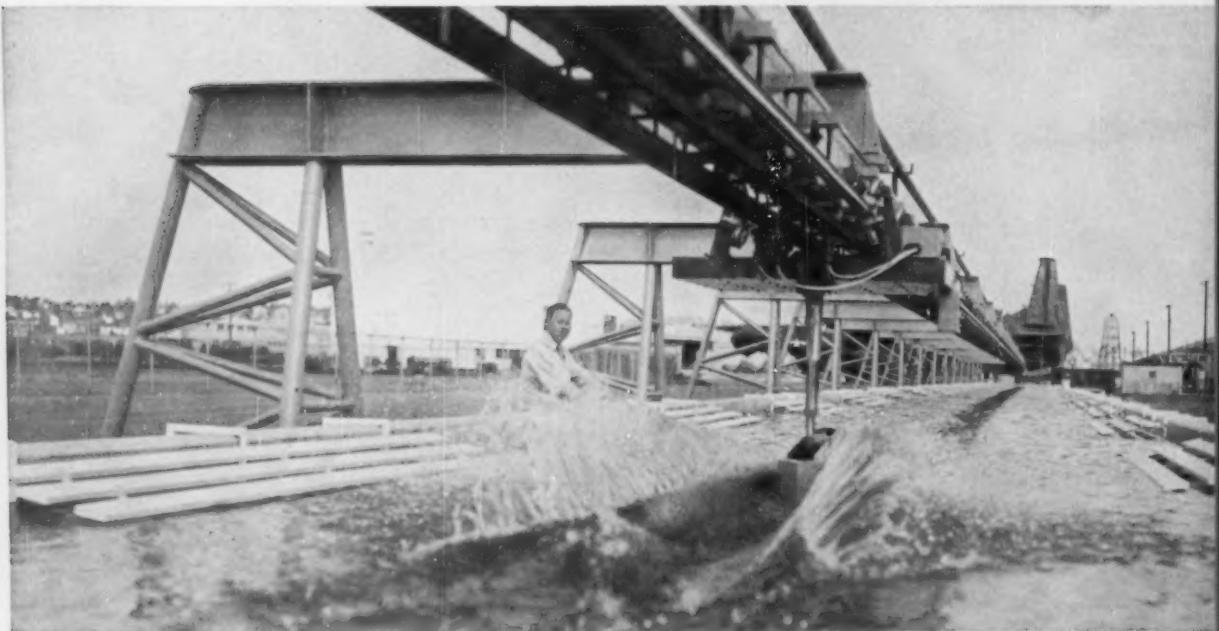
Company \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

# CARBORUNDUM

Registered Trade Mark



Above photo shows spray pattern as model hull slices through the water. Data recording devices travel with the model over stainless steel rails. High-speed motion picture cameras record hull performance through heavy plate glass windows in sides and bottom of tank.

## New use for Stainless Steel developed by Convair in testing seaplane hull models

Stainless steel bars are playing an important part in testing hulls for advanced-type seaplanes at Convair's new 300-foot model seaplane towing tank, first unit of a proposed \$800,000 hydrodynamic laboratory. Convair is a Division of General Dynamics Corporation.

Testing is conducted by suspending a hull model from a carriage which runs on a double overhead rail. The rails are 1 3/4"-dia. cold finished stainless steel bars. Carriage rollers which run on the bars are also stainless steel. The rails are suspended three feet over the water level on

"I" beams and tubular steel framework towers.

Stainless steel was selected for this application because of its extremely high resistance to corrosion, wear and abrasion—resulting in ease of maintenance. Cold finishing the bars provides the additional benefits of higher tensile and yield strength, close tolerance, uniform soundness and a fine surface finish permitting smooth, accurate operation of the testing device.

Stainless steel is the aircraft metal of many uses. It has literally thousands of both ground and air applications. Its exceptionally high

**REPUBLIC**  
*World's Widest Range of Standard Steels*



Seaplane hull model is poised for run down 300-foot long towing tank. When complete, entire facility will be 700 feet in length and will be enclosed in a windproof structure to prevent gusts and inclement weather from interfering with tests.

strength-to-weight ratio permits the use of thinner, lighter sections. Use it to gain space or save weight without any sacrifice in strength or safety. Or use it to resist heat, corrosion and abrasion.

Republic—world's largest producer of aircraft steels—supplies ENDURO Stainless Steel in all commercial forms including hot rolled and cold finished bars, forging stock, plates, sheets, strip and wire. Republic metallurgists and engineers are ready to help you apply stainless steel to your present and future development work. There's no obligation. Just mail the coupon.

# STEEL

*and Steel Products*

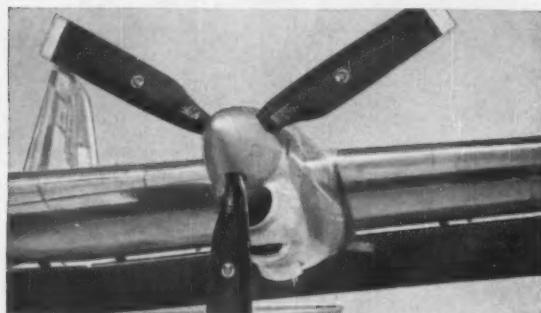
September 6, 1956



ANOTHER NEW USE FOR STAINLESS STEEL was created with the advent of the turboprop engine. Tank trucks used in refueling turboprops consist of two separate compartments. One is fabricated from Republic ENDURO Stainless Steel to resist the corrosive effect of the alcohol-water mixture. The other, for kerosene, is made from Republic 50 High Strength Steel for lightness and strength. The compartments are then welded together into one strong unit.



NEWCOMER AMONG AIRCRAFT METALS—TITANIUM saves weight and cuts cost in Navy helicopter. Use of .016 gage Republic Titanium, Type RS-70, Annealed, for firewall sections between pilot and engine compartments has resulted in substantial savings in weight and production costs. This type has good forming qualities and a minimum tensile strength of 80,000 psi. Republic melts and rolls titanium in all forms.



NEW EXTRUSION PROCESS AND ALLOY STEEL combine to provide greater strength and resistance to fatigue with minimum weight in turboprop propeller blades. The extruded blade, produced by the controlled extrusion process developed by Curtiss-Wright, starts as a single-piece billet of Republic Alloy Steel. The outstanding qualities of Republic Alloy Steel together with the extrusion process have resulted in a superior blade and increased production with reduced cost.

## REPUBLIC STEEL CORPORATION

Dept. C-2388  
3104 East 45th Street  
Cleveland 27, Ohio

Please send more information on:

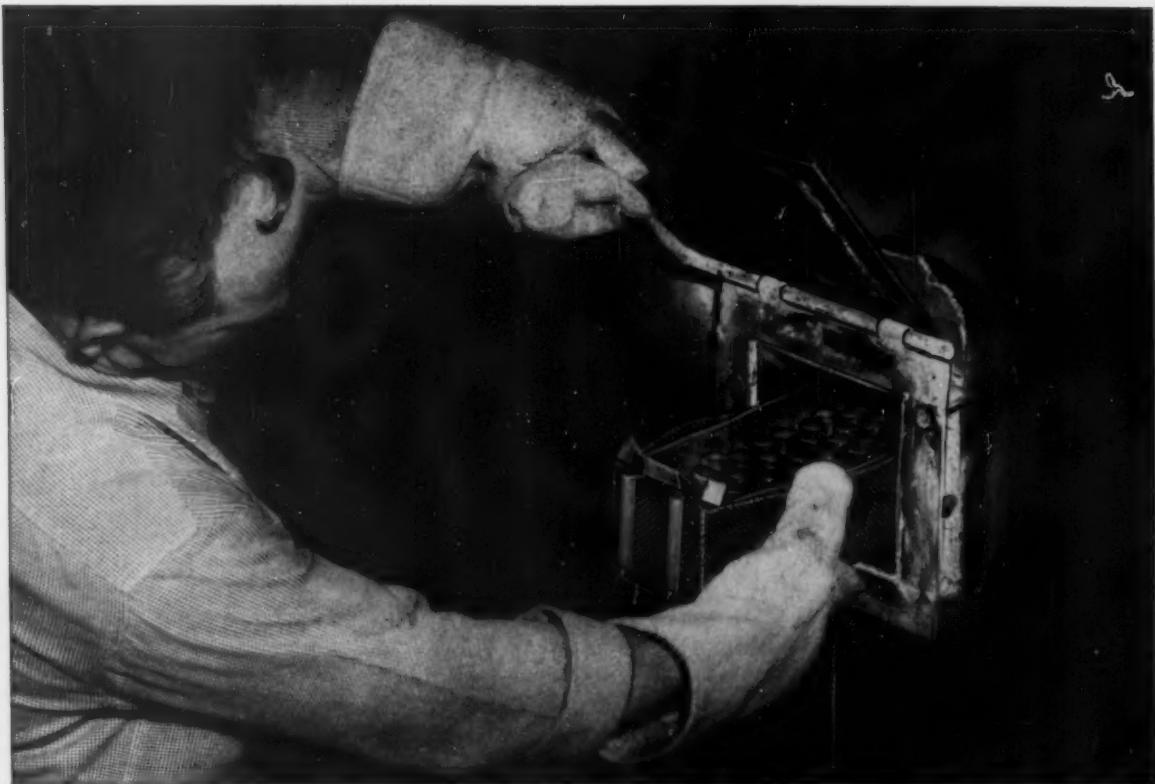
ENDURO® Stainless Steel       Titanium Alloy Steel  
 High Strength Steel       Alloy Steel  
 Have a metallurgist call.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



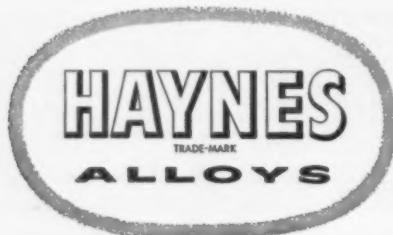
## 720 Hours at 2300 Deg. F ... Didn't Hurt This Muffle

Continuous exposure at 2300 deg. F had little effect on a muffle made of HASTELLOY alloy X and used in this electric annealing furnace. The muffle was subjected to the intense heat for an entire month, 24 hours a day. After this extended service it was examined, found to be in excellent condition, and put back in service.

Actually, HASTELLOY alloy X solved a dual problem for this Company. The muffle is used in a furnace for annealing cold-drawn parts. Periodically, it is used for annealing

superalloy parts at 2300 deg. F. Most of the time, however, it is used to anneal stainless steel parts at lower temperatures. Other materials were either inadequate for this service or too costly. Only HASTELLOY alloy X could handle both conditions economically.

HASTELLOY alloy X is a wrought high-temperature alloy with excellent strength and oxidation resistance to 2300 deg. F. For a copy of a booklet describing HASTELLOY alloy X, get in touch with the nearest sales office listed below.



**HAYNES STELLITE COMPANY**

A Division of Union Carbide and Carbon Corporation

**UCC**

General Offices and Works, Kokomo, Indiana

Sales Offices

Chicago • Cleveland • Detroit • Houston • Los Angeles • New York • San Francisco • Tulsa

"Haynes" and "Hastelloy" are registered trade-marks of Union Carbide and Carbon Corporation.

**"We bought a  
20-ton Lectromelt\* Furnace  
for inventory control,"**  
*says Rotary Electric Steel*

**Their five big furnaces run  
a minimum of 60 tons each**

● 15 to 30-ton lots of stainless steels can be produced in a hurry in this new Lectromelt furnace. That enables Rotary Electric Steel Company of Detroit to offer prompt delivery when certain of these special steels are out of stock.

Precise quality control and constant checking of the steel at each processing step are basic in Rotary's production. The ease with which alloys can be adjusted and the speed with which Lectromelt furnaces can be put to work makes them well suited to these policies.

Lectromelt furnaces for melting and refining are described in Catalog 9-B. For a copy, write Lectromelt Furnace Company, 312 32nd Street, Pittsburgh 30, Pennsylvania (a McGraw Electric Company Division).



Manufactured in... ENGLAND: Birlec, Ltd., Birmingham... FRANCE: Stein et Roubaix, Paris...  
BELGIUM: S. A. Belge Stein et Roubaix, Bressoux-Liege... SPAIN: General Electrica Espanola, Bilbao  
...ITALY: Forni Stein, Genoa... JAPAN: Daido Steel Co., Ltd., Nagoya

\*REG. T. M. U. S. PAT. OFF.

**WHEN YOU MELT...**

*Lectromelt*





#### WHEN AUTOS CAME IN ONE COLOR

Hard to believe, isn't it, that the "last word" in the autos of our youth are now museum pieces. The automotive industry has drastically changed our mode of living and today is meeting the challenge of an apparently insatiable public demand for higher standards of design, power and comfort in personal transportation. Many of the advances in car design and performance have been made possible by improved steels. Working with automotive manufacturers to provide the *right* steels has been one of the important jobs at Inland for many years.

**INLAND STEEL COMPANY** 38 South Dearborn Street, Chicago 3, Illinois. Sales Offices: Chicago, Milwaukee, St. Paul, Davenport, St. Louis, Kansas City, Indianapolis, Detroit, New York. Steel products supplied to the automotive industry include hot and cold rolled sheets and strip, bars, plates, structural, 4-Way safety plate. Other products: tin mill products, Ti-Co galvanized sheets, reinforcing bars, rails and track accessories, coal chemicals.



## NEWSFRONT

**Standardization: The Military Marks Time**

Look for Congress, reconvening in January, to start prodding the Pentagon more forcefully for action in its all-but-stalled drive for standardized purchasing. Military is now in its seventh year of fussing over a basic Army/Navy/Air Force catalog. And despite claims of integrated buying, great bulk of purchases are still made separately. Congress wants it stopped; demands less duplication of effort.

**Foundry Licks Porosity Problem**

Steam treating small shell-molded grey iron valve bodies, as a means for impregnating their pores with a tough oxide film, enabled one firm to drop part rejects for porosity from former 20 pct levels to less than 1 pct. At the same time, a cadmium-plating treatment formerly given parts was dropped from the production docket. Parts emerge from the furnace treatment with a usable-as-is finish.

**Air Conditioning Individualized**

Unusual supplemental air conditioning marks a Houston tool plant where bits are hardfaced. Entire tool joint building is air conditioned, but heat from tool joints is further controlled by insulating hoods enclosing each welding jig. Front of each jig enclosure is jacketed to supply conditioned air to welder's hands. Separate adjustable grills next to each welder are on this jacket line too, which is separate from the regular room air-conditioning supply.

**Cost-Of-Living Side Effects**

Accounting departments may find labor contract cost-of-living clauses a growing headache. Recent index rise, for example, adds \$10 million to the yearly payroll of one major electrical manufacturer. More than 500,000 calculations went into figuring new rate charge charts. Company's new Univac computer helped minimize headaches in this case. It handled the whole job in just 20 minutes.

**Armies Eye The Whirleybirds**

Helicopters are looming larger on the military mind, both here and in Russia. Army Intelligence appears interested in smuggled reports, photos showing Red helicopters small enough to land on bed of a truck. Here, Army has just awarded new contracts for studying large "flying crane" design 'copters, capable of luging loads to 16 tons. Aim of both appears to be stepped up military mobility, less dependence on conventional truck/highway transport.

**Cold Winter Coming On Cold Finished Bar?**

While cold finished bar has remained relatively easy in supply, a few large consumers are reporting low inventory stock on this item, so that they will have to replenish stocks very shortly if their own high rates of operation continue. This potential demand, along with the fairly tight mill scheduling for hot-rolled bars, could mean a substantial tightening of the cold finished bar picture by December.

**Progress in Cold Forming Techniques**

Behind-the-scenes improvements in cold forming techniques suggest that more and more chip-making operations are on their way out. Cold extrusion and a variety of cold roll-forming methods coupled with newly-discovered facts about plastic deformation, will soon permit operations on much larger workpieces than are now being handled.

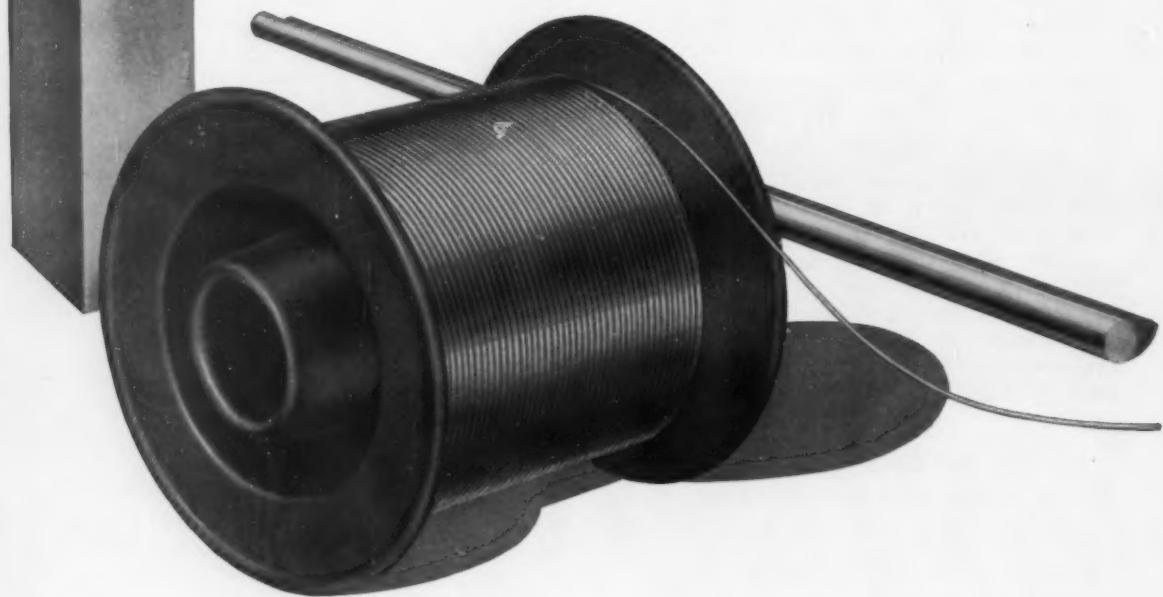
**BDSA Report Stirs Controversy**

A recent BDSA report stating that Armed Services aren't getting up-to-snuff general purpose electronic test equipment, and that the electronics testing industry isn't being built up to emergency mobilization levels, is rousing builders ire. They feel armed forces' buying policies have forced many responsible producers out of the military picture. Expenditures dropped off from almost \$35-billion in '52 to about \$10-billion last year.

# GRANODRAW SS®

## -unique oxalate coating process

facilitates cold forming of  
stainless steel, eliminates leading  
and de-leading operations



The absorbent crystalline coating produced by this ACP process is chemically bonded to the pickled and activated metal surface and acts as a carrier for suitable lubricants. The combination of the Granodraw SS coating and lubricant greatly improves production and product quality in such cold forming operations as drawing of wire, bars and tubing; cold shaping; deep

drawing; cold heading; ironing; necking; extruding; and upsetting. Among the other advantages of the Granodraw SS coating is the elimination of leading and de-leading operations; the storing of coated products indefinitely without breakdown of the coating or pitting of the base metal; and the short coating cycle. For complete information about Granodraw SS, write ACP today.

VISIT US AT BOOTH 2332, 38th National Metal Exposition & Congress, Cleveland Public Auditorium, October 8 to 12 inclusive.

**AMERICAN CHEMICAL PAINT COMPANY, Ambler 20, Pa.**

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## New Partnership—Business and Education

**Industry finds aid to education a necessary activity . . . Form of aid varies, but intent is to fill gap between demand and supply of qualified graduates . . . Aid reaches \$100 million a year—By G. G. Carr.**

♦ BUSINESS giving to education is running about \$100 million a year. That's almost \$200 a minute.

The figure includes direct contributions to schools, gifts to joint fund-raising associations, scholarship funds, company foundations, trust funds, and contract research.

This rough estimate by the Council for Financial Aid to Education, Inc., covers the year 1955. It compares with approximately \$80 million three years earlier.

### It All Comes Back

It's a good investment. The financial investment in the educational field is returning blessings a hundred-fold. Business is reaping a rich harvest of college-trained personnel and academic knowledge. And it's sowing the seeds for still richer harvests to come.

It's a hard business fact that

many companies have come to recognize: colleges and universities need financial support if they are to develop with a growing population and growing needs of industry. Likewise, promising students need help. Academic research must be financed. It's not a case of charity. It's self-defense.

Says the General Electric Co., long-time giver to education:

"Our objectives are (1) new knowledge, through research and competent teaching, (2) an adequate supply of educated manpower, and (3) an economic, social, and political climate in which companies like ourselves can survive and continue to progress."

### Greater Needs Ahead

Those close to the picture, like CFAE, acknowledge that business is doing a good job for education,

that it will do better in the future. But the financial needs of the schools are akin to a bottomless pit.

For example:

The U. S. Office of Education estimates that college enrollments will rise from 2.7 million in 1955 to over six million in 1970. Gift income of colleges in 1954-55 was a bit over \$500 million. CFAE estimates that over the next 10 years this income must be increased by other \$500 million.

### Bethlehem Plan

Business has devised many ways of giving. The educational foundations, like those of Ford and U. S. Steel, are the most publicized. Others give direct from company funds. Several match alumni gifts from employees. Still others contribute to the schools that provide them with the most graduates.

### Where Business Plants Its Educational Dollars

(Pct of Total Giving)

Source:  
1955 Survey by  
Council for  
Financial Aid  
To Education

Unrestricted Grants

25%

20%

15%

10%

5%

4

3

2

1

0

Undergraduate Scholarships

Buildings, Other Capital Projects

Research (Other Than Fundamental)

Graduate Fellowships

Fundamental Research

Aid To Teaching

Cost-of-Education Supplement

Student Loan Funds

Endowments

Specific Departments

Faculty and Staff Compensation

Bethlehem Steel, whose total contributions will approach \$1 million this year, pays \$3000 to any privately-endowed college for each of the school's graduates selected by the company for its college graduate training course. It's a case of value given for value received.

Says E. G. Grace, chairman of Bethlehem:

"Through such payments Bethlehem gives recognition to the fact that four years of education costs a college more than it receives from a student in tuition and other fees, and that his education makes the college graduate a valuable asset in the conduct of Bethlehem's business."

An unusual twist, that of giving going businesses to colleges, has put some schools into fields far removed from education. Hence Harvard owns a brewery, New York University a spaghetti factory. The college runs the business, retains the profits.

One type of college program in particular permits business firms

to make a significant contribution at bottom cost. This is the cooperative college plan, whereby students alternate one term at college with one term of work in a job related to their major.

Originally developed at University of Cincinnati 50 years ago, the co-op plan has spread to 37 of the nation's top colleges and universities. Pioneered for engineering students, it is now open also to students in business administration, education, interior, costume, and industrial design, advertising, architecture, and home economics.

Over 600 companies work with the co-op colleges, with more than 75 involved in the program at Cincinnati alone. Working with this one school are such top firms as Cincinnati Milling Machine, Armclo Steel, Allis-Chalmers, Chrysler, and International Nickel.

#### Good Results

The companies report that the majority of students stay with their co-op firm although there is no requirement to do so.

How does it work out? Frederick V. Geier, Cincinnati Milling Machine president, says:

"In every rank and field of

endeavor, industry today enjoys the outstanding service and able leadership of many men whose capabilities directly reflect the basic principle of the cooperative system."

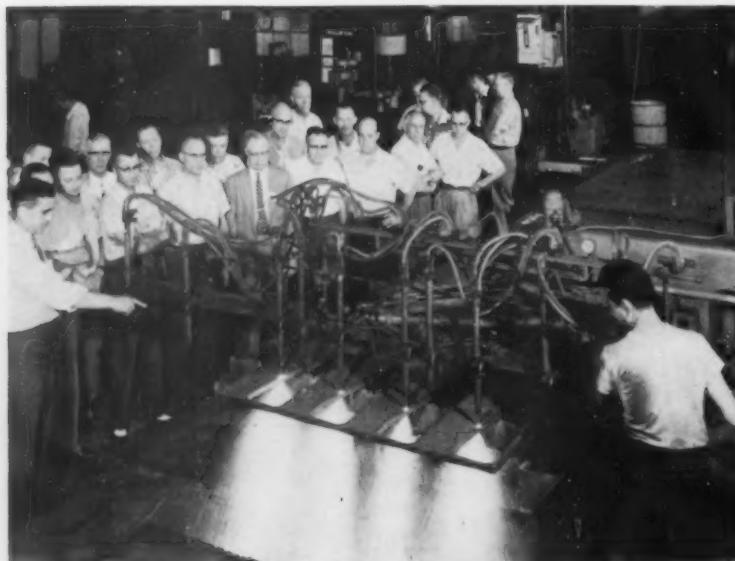
Republic Steel Corp., has another approach:

Charles M. White, Republic chairman, reports that his company, in cooperation with Case Institute, participates in an Economics-in-Action program each summer. About 50 economics professors receive six-week practical courses on the economics of business and industry. And the company participates in the cooperative college programs.

#### Results Show

Republic also works with colleges on special projects. For three years, the firm teamed up with University of Chicago to conduct a basic economics program for 6000 supervisors. The company-university team is now working on courses in the field of human relations for supervisors.

Scholarships can often pay direct benefits to the company or industry granting them. The foundry industry has since 1947 sponsored,



EDUCATION-INDUSTRY cooperation in action at the Joseph T. Ryerson plant in Chicago. Economics teachers from 21 midwestern colleges observe electric-eye controlled flame cutting machine produce four irregular shapes simultaneously from heavy steel plate. Visit was part of University of Wisconsin's four-week Economics In Action course.

## Business And

A survey by the Council for Financial Aid to Education, Inc., developed the following factors used by business firms as guideposts in allocating funds to education:

#### Educational Factors:

Accreditation, academic excellence, technological or professional program, quality of leadership, private control, liberal arts program, postgraduate or research specialization, evidence of a sound long-range development program, university program, availability of

through Foundry Educational Foundation, a scholarship program at 16 colleges to stimulate interest in casting as a career. Since starting the program it has seen college foundry laboratories grow from a value of \$1,034,000 to \$2,446,250 in '56; foundry professors from 19 to 70; and foundry courses available, 17 - 105.

Other industry benefits have been an increase from 8.5 pct to 31 pct of all engineering students taking foundry courses. Number of departments requiring foundry courses has jumped from 20 to 64, and over 1600 engineers have graduated into the foundry industry and allied fields since '47.

Scholarships can also be used to develop professional interest in a field rather than in an industry. Purchasing Agents Assn. of Chicago awards two full 4-year scholarships at Illinois Institute of Technology for young men interested in a purchasing career. The association also advises on the curriculum, which leads to a B. S. in business with a major in purchasing.

#### Teach the Faculty

Industry can be a big help to education just by allowing faculty

## How Much Should Business Give?

*Says the Council for Financial Aid to Education:*

- "Discussions by business men and educators have indicated that as much as 1 pct of corporate net taxable income might be a reasonable share by business in the institutional support of colleges and universities and in scholarship, fellowship and research programs."
- "Based on 1954 net taxable income figures, 1 pct could have meant \$340 million for strengthening the colleges and universities and their faculties. It would have provided one-third of the \$1 billion annually required."

members to observe the way a company is run. Foundation for Economic Education has for some time been administering a program whereby college professors are installed as summer observers in industrial plants. The companies involved pay only living and transportation expenses. Originally started with engineering and business administration faculties, the project now includes liberal arts teachers, has had enthusiastic response from all sides. Many of the

professors have developed study programs on their own, have repaid their industry hosts with valuable management ammunition.

#### Give and Take

With the current emphasis so heavily on business giving to colleges, it is easy to forget that the business-college relationship is a two-way street. Business takes from as well as gives to colleges. And both processes frequently occur simultaneously.

A current project of steel warehouses is a case in point. Faced with a continuing decline of member earnings, American Steel Warehouse Assn., Cleveland, took a leaf from other distribution industries and looked into cost accounting. Korhumel Steel Corp., Milwaukee, headed by William Lewis, agreed to act as guinea pig.

Prof. Thomas McCann at Marquette University, in the same city, was conducting classes in the subject. Mr. Lewis sent a man to attend the courses. Results were so good that Mr. Lewis, Prof. McCann and Robert G. Welch, warehouse association executive secretary, joined forces to form the core of a Cost Study Committee with other associations and worked out a manual for cost analysis for metal distributors.

## Education: Guideposts To Giving

information about academic policies and operations, evidence of self-study, men's student body, size, good public relations, public control, faculty-student ratio, two-year type of program, coeducational student body, women's student body, church-related or non-church-related status, in that order.

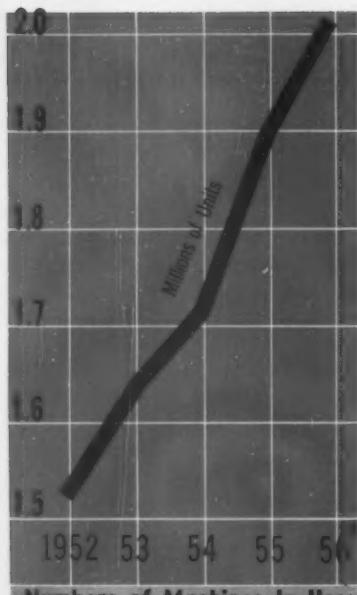
#### Business Factors:

Evidence of sound financial management, membership in a state or regional association, condition of physical plant, general alumni support, publication of

financial statements, ability to obtain support of other companies, ability to obtain community support, ability to obtain support of friends (or families) other than alumni, ability to obtain support of general welfare foundations, ability to obtain denominational support, size of endowment, ability to obtain support of non-alumni groups; medium charge for tuition and other fees, high charge for tuition and other fees; low charge for tuition and other fees, in that order.

Based on a 1956 survey among 81 business concerns.

*Reprints of this article are available as long as the supply lasts. You may obtain a copy from Reader Service Dept., THE IRON AGE, Chestnut & 56th Sts., Philadelphia 39, Pa.*



Numbers of Machines In Use (exclusive of penny candy)

Annual Sales from Vending Machines

1952	\$1.4 billion
1953	\$1.575 billion
1954	\$1.65 billion
1955	\$1.75 billion
1956	\$1.87 billion

\*) 1956—Iron Age Estimate  
Source: Vend Magazine



## VENDING: Automation Here Too!

Expect over 2 million vending machines in circulation in 1956 . . . Manufacturers rapidly becoming a top metalworking market . . . Future outlook bright—By F. J. Starin.

♦ "PUT A NICKEL in it," the shout of derision that greeted hapless motorists in the pioneering days of the horseless carriage, has come to be the symbol of a big and still-growing metalworking market.

Even though the nickel must now be accompanied by dimes—and even quarters—you can buy almost anything from chop suey to perfume from one of the nation's biggest sales force—vending machines.

In 1955 Americans put more than \$1.75 billion worth of coins into silent salesmen for some variety of 42 different types of merchandise. To meet the demand, vending machine manufacturers had over 1.8 million machines in circulation.

### Good Customer

The Vendo Co., Kansas City, Mo., largest manufacturer of vending machines has become one of the major users of sheet steel in that area. It is consuming about 700 tons per month, in addition to large quantities of aluminum strip and other metals.

And Vendo is a good customer of the machine tool industry. Recently the company installed a new 600 ton Verson press in its metal forming dept. It also uses such equipment as automatic spot welders specially designed to gang-weld, high speed Henry & Wright automatic presses which will produce 10 different components,  $\frac{1}{4}$  mile of conveyors, and batch ovens.

### Future

Outlook for the future of vending machines, and their metalworking purchasing potential, is good. Americans are expected to

plunk almost \$2 billion into machines in 1956. To handle the increase, manufacturers will swell the number of machines in circulation to over 2 million.

Vendo expects more than 50 pct increase in net sales in 1956, following acquisition of Vendorlator Mfg. Co., Fresno, Calif.—\$40 million, as compared to \$20.7 million in 1955, and a shade under \$10 million in 1952.

### Industrial Machines

Vending machines in most cases are sold to the vending operators who supply the merchandise and service them. They place machines in plants and factories by paying the lessor a percentage of the gross income, or by guaranteeing unusual service. The average service company will make an analysis of any tentative location taking into consideration such things as physical layout, type of industry, number of shifts, and so on.

Estimates of the number of factories and industrial plants which have installed machines range from  $7\frac{1}{2}$  to 9 out of 10. One survey reported that 20 pct of all factories rely on vending machines exclusively to feed employees. A Vendo spokesman predicts that vending will eventually be taking care of 80 pct of the in-plant food.

### New Models

Food companies are doing their share to build the vending machine market. Many, such as H. J. Heinz Co. and Campbell Sales Co., have arrangements with vending machine manufacturers for production of models to handle their products. A number of dairies including Meadow Gold Dairy, Okla., and Clover Creamery Co., Va., have added vending machines, serviced and supplied by the regu-

lar drivers, to their sales media. So, there are now machines available which, in combination will serve full, hot or cold meals. The hot food machines, newest in the industry (Vendo expects to sell \$2 million worth in 1956), is a big new market for aluminum foil, used extensively as containers.

Development of new models, offering greater variety, is progressing rapidly. Vendo reports that its engineering staff has at least six new models under consideration at all times. Acceptance of a new machine, often suggested by the service groups, is dependent on commercial feasibility and survey of the vending and catering trade, and industrial management as to its potential.



Photos from The Vendo Co.

A survey by the Paper Cup & Container Institute lends support to the idea that there is a big future for vending machines in plants and factories. PCCI found that most plants already have some vending facilities, ranging from 91 pct of plants with over 1000 workers, to 31 pct with less than 250 employees.

Management seems to be satisfied. About 72 pct of the companies polled reported that the machines had no detrimental effect on the production efficiency or rate.

Employees, generally speaking, are all for use of vending machines, not only for the convenience. Over 82 pct of the companies polled said that any profit which the machines made was used for employee's recreation programs and benefits. PCCI reported that profits frequently exceeded \$1000, and went as high as \$75,000 in one large plant.

## PRODUCTION

# PLASTICS: Working With Steel

**U. S. Steel in experimental production of plastic coated steel . . . New emphasis is also put on enameling sheet production . . . Long range possibilities terrific.**

◆ PLASTIC and porcelain enamel coatings for steel moved into the spotlight with the news that a major mill is stepping up efforts in both fields.

United States Steel Corp. is putting a new plastic coated sheet into experimental production and marketing stages. Toughness of the new product is expected to make it suitable for fabrication and permit low cost manufacture of appliance, automotive and other pieces.

The same mill is in the process of installing at its Irvin Works a new line for enameling sheets. These are special analysis sheets which go mainly to appliance makers for coating with porcelain enamel and use in refrigerators, washers, and the like.

### Production Needed

Expansion of enameling sheet facilities is of immediate significance. New interest in enameled curtain walls and building exterior panels comes on top of a long term shortage of appliance sheet. A spokesman of Westinghouse Appliance Div. says recurring pinches have restricted production of parts that would normally be porcelain enameled.

But the long range possibilities of plastic coated sheets are spectacular. It's no secret that steelmakers are watching carefully the inroads plastics have made in the automotive and appliance fields. To meet this challenge, the mills have been searching hard for a workable product that would combine the decorative qualities of plastic with the strength of steel.

A lot has been done in the general field. Thomas Strip Div. of Pittsburgh Steel Co. now sells a plastic strip in coils and cut

lengths. U. S. Steel's National Tube Div. makes all-plastic pipe. A number of producers turn out plastic covered pipe. Republic Steel Corp. in its process extrudes a tube of plastic and slips it over the steel pipe.

But the tonnage applications of plastic coated steel have never really been developed. Last year automakers took a total of 169,000 tons of all types of coated sheet (not counting galvanized). This compares with better than 10 million tons of standard sheet.

### Surface Problems

Difficulty has been to get a plastic surface and bond that would stand up under fabricating operations. As it stands now, decorative finishes must be applied after a piece has gone through basic forming steps.

U. S. Steel believes its new sheet may answer this problem. The process being tested does not use plastic in costly strip form. It applies melted-down vinyl plastic to an adhesive coated surface. Heat is applied to solidify the plastic; prior to cooling, the vinyl is embossed with leather grain or other finishes.

The product can be made in almost any color. Pilot line facilities will turn out 18 to 20 gage sheets, 24 to 52 in. wide. (Big demand is for stock outside the stripmill size.) Expected selling price is 18¢ to 25¢ a foot.

### Where to Use It

Applications seen for plastic coated steel include automotive panels, radio and television cabinets, wall panels, appliances and furniture. The potential of these markets and the move toward them by U. S. Steel have set other mills to simmering.

## FAST TAX: Steel Makes A New Pitch

**Applications for fast-tax privileges covering projects worth \$680 million filed by four steel firms . . . Mobilization officials inclined to reopen goals, but prospects look slim—By N. R. Regeimbal.**

♦ THE QUEUE for tax amortization aid to finance new steel industry construction is lengthening, but top government mobilization officials have not decided whether to reopen the expansion goals for the industry. A decision is expected by mid-September.

Four large steel firms now have applications pending for tax amortization covering some \$680 million worth of new construction. While the question of whether new steel capacity is necessary for defense purposes is still unsettled, mobilization people are showing an inclination to reopen them.

(Some Washington sources say steel producers have slim chance of getting defense goals reopened. Principal opposition comes from Treasury Secretary Humphrey, who opposes fast tax write-offs for strictly civilian expansion, unless all industries receive the same treatment.)

Originally, mobilization and defense planners set up a restudy of three steel goals — structural, tubing, and heavy plate. In an ap-

parent move to blunt criticism of a possible decision reopening these goals, and perhaps other steel goals, they are now conducting a restudy as well of 31 other expansion goals in other fields which are now open.

### Behind Re-Study

The government is basing its re-examination of steel capacity goals on these key factors: Current tight supplies of virtually all steel products, mounting defense needs, and a new realization of the need for steel to rehabilitate the civilian economy in case of attack. Added to this now is a study of whether any of the goals now open are being used to promote nondefense production, and should be closed.

This indicates that the Eisenhower Administration might develop a trade—close some open goals and reopen some closed steel goals. Or at least, if criticism comes, officials will have a full sheaf of facts to defend the tax-am program.

Jones & Laughlin, which asked for tax aid for a \$250 million mill to produce oil and gas pipe some weeks ago, opened the steel expansion question. Tax aid for J & L under a still-open goal (No. 224) was turned down by the Pentagon, but military leaders urged a re-study of the steel goals.

### Line Forms At Right

Two weeks ago, U. S. Steel filed an application for tax amortization for \$156 million expansion of seamless tube and supporting steel capacity for its National Tube Div. at McKeesport, Pa., and at Lorain, O.

On June 27, U. S. Steel filed seven more applications: A \$5 million structural project, a \$17.8 million steel plate project, a \$33.1 million steel mill, and a \$8.9 million steel mill expansion, all at Chicago; two steel mill additions of \$62.2 million and \$46.4 million, and a coke oven project of \$35 million, at Gary, Ind.

Youngstown Sheet & Tube on the same day asked the government for fast write-off on a proposed \$24.3 million pipe and tube project at Campbell, O. Inland Steel, also on the same day, filed for four projects, all at East Chicago: A basic steel capacity increase to cost \$4.1 million; a steel strip expansion to cost \$16.2 million; a steel ingot expansion costing \$18.4 million, and a pig iron expansion costing \$2 million.

### Taking Precautions

Defense planners now are making sure that the information on which they base a decision in the steel industry goals will stand up as "consistent" with other open goals, and that it will not be subject to criticism as brought on either by present shortages.

### Who Wants Tax Amortization

Company	Product	Location	Cost
Jones & Laughlin	Oil Country Tubing	Houston, Tex.	\$250,000,000
U. S. Steel	Seamless Pipe and Steel	McKeesport, Pa.	156,000,000
	Supporting Facilities	Lorain, Ohio	
U. S. Steel	Structural Steel	Chicago	5,000,000
U. S. Steel	Steel Plate	Chicago	17,800,000
U. S. Steel	Steel Mill Capacity	Chicago	33,100,000
U. S. Steel	Steel Mill Addition	Chicago	8,890,000
U. S. Steel	Steel Mill Addition	Gary, Ind.	62,200,000
U. S. Steel	Steel Mill Addition	Gary, Ind.	46,400,000
U. S. Steel	Coke Ovens	Gary, Ind.	35,000,000
Youngstown Sheet and Tube	Pipe and Tube	Campbell, Ohio	24,300,000
Inland Steel	Steel Products	East Chicago	4,100,000
Inland Steel	Strip Steel	East Chicago	16,200,000
Inland Steel	Steel Ingots	East Chicago	18,400,000
Inland Steel	Pig Iron	East Chicago	2,020,000

## STEEL: Adams Heads Jones & Laughlin

**Avery Adams shifts from Pittsburgh Steel to J. & L. . . . Maxwell takes over as president of Pittsburgh Steel . . . Reshuffling places two salesmen at helm . . . Austin named vice chairman of J. & L.**

♦ A RESHUFFLING of top management at Jones & Laughlin Steel Corp., and Pittsburgh Steel Co., places two top-flight salesmen at the helms of both companies.

Avery C. Adams, former president of Pittsburgh Steel, takes over



Avery C. Adams

as head of J. & L., effective Oct. 1. Meanwhile, Allison R. Maxwell, Jr., formerly vice president-sales, Pittsburgh Steel, was elected president and chief executive officer of Pittsburgh Steel.

C. L. Austin, formerly president of J. & L., becomes vice chairman of the board and chairman of the newly-formed finance committee of the corporation. Admiral Ben Morell is chairman of J. & L.

H. B. Collamore, a director of Pittsburgh Steel since 1936 and senior member of the board from point of service, was elected chairman of Pittsburgh Steel.

### Operation Bootstrap

Mr. Adams, who began his career in steel as a laborer in an open-hearth shop in Warren, O., has been selling and producing steel since the 1920's. Since his election as president of Pittsburgh Steel on March 1, 1950, he literally lifted

the company by its own bootstraps. His "Program of Progress" poured \$115 million into expansion and modernization. He shifted sales emphasis from semi-finished to finished products.

In his long career in the industry, Mr. Adams has been manager of tinplate sales for Republic Steel Corp., manager of sheet sales for Carnegie-Illinois Steel Corp.; vice president of Inland Steel Corp.; vice president-sales, U. S. Steel Corp. of Delaware; partner in a



C. L. Austin

steel export and warehouse operation; vice president and director of Portsmouth Steel Co.; executive vice president and director of Detroit Steel Corp., as well as president of Pittsburgh Steel and, now, of J. & L.

Mr. Maxwell, one of the industry's younger executives, has been with Pittsburgh Steel since 1935 as a sales trainee in the company's mills at Monessen and Alleport, Pa. Before hitting the road as a salesman and sales engineer, he served as assistant manager of industrial engineering at the two plants. After three years in the Navy, he became manager of control planning in 1945. Four years



Allison R. Maxwell, Jr.

later he became assistant general manager of sales, and in 1952 was named a director and vice president-sales.

In other changes at Pittsburgh Steel, E. M. Barber, executive vice president and director, becomes vice chairman of the board, a newly-created position; Donald C.



E. Milton Barber

Duvall, vice president-industrial relations, becomes a member of the board; Richard McL. Hillman, treasurer, is elected vice president and treasurer, and Joseph G. Smith, director of purchases is vice president-purchases, raw materials.

## FOUNDRIES: Like Long Labor Contracts

**More than three-fourths of foundries sign labor contracts of more than one year's duration . . . Growing number go for three years of uninterrupted work . . . Both labor and management approve.**

♦ THE FOUNDRY INDUSTRY, nationally, swung heavily to a three year contract this year.

And despite some opposition voiced at the August meeting of the International Molders and Foundry Workers, it's positive that 1957 foundry labor negotiations will see a large number of firms currently holding one-year labor contracts swinging over to the long term 2- to 3-year contract. What's more, labor union men will favor the move.

Foundry labor negotiations are generally conducted in the second quarter, and as the smoke cleared from the bargaining tables this spring, it was obvious that the old one-year contract had taken a real drubbing.

In 1954 the National Foundry Association surveyed contracts held by its members and learned that 56 pct were of only one year's duration, and a mere 6 pct were for as long as three years. Even at that time a few rugged pioneers were negotiating contracts longer than three years' duration, but these were a handful, less than 5 pct of the total sample.

As of the close of the 1956 foundry bargaining season, only 22 pct of the total number of new contracts negotiated were for one year, 42 pct were in the two year category, and 36 pct were for three years. Of the two and three year contracts, 22 pct provide for reopeners in 1957, mainly on wages. The three year contracts

provide for a 1958 wage reopeners.

Why is the union happy, and most are, with an agreement that limits bargaining for a two or three year period? Because 71 pct of the two and three year agreements provide for automatic wage increases in 1957.

### Chicago Plan

The Chicago Foundry Assn. agreement, completed April 30, represented the first 3-year contract for the group, and covered 56 foundries in Chicago and 12 in Aurora, Joliet, and Batavia. Wage gains for the first year were 7¢ to 17¢ with an additional 5¢ to 10¢ in 1957. Although the contract runs until 1959, it may be reopened for wage negotiations in 1958.

Considering that average hourly earnings per worker in the foundry industry advanced about 8 cents between May 1955 and May 1956, the arrangement looks like a bargain for all concerned.

Independents in the area began following the trend almost immediately after the agreement. What's more, in the months following, those who settled for a short term contract have begun to show increasing dissatisfaction with the arrangement, and the dissatisfaction stems from both management and union representatives. In one case in which a one year contract was negotiated, and a new wage settlement made at a lower figure than the general wage pattern, there's already a willingness to consider a higher scale in exchange for a two year settlement despite the favorable settlement of 1956.

To management, the three year contract means stability in wage costs.

## Steelworkers Get Ready for Escalator

♦ Although watching the Consumer Price Index is an old habit to autoworkers and many thousands of workers whose labor contracts are tied to a cost-of-living index, it's just gaining interest among steelworkers.

For the first time in steel industry history, the steel labor contract now has an escalator type clause providing for increases or decreases in pay as the cost-of-living goes up or down.

Reason for current interest is the fact that Bureau of Labor Statistics index stands at 117.0,

more than enough for a 1¢ per hour increase and only 0.1 of a point away from 2¢.

However, the period in the steel contract is for twice a year adjustment. The first will occur for the first published index as of Nov. 15, with pay adjustments effective Jan. 1, 1957. Next interval will occur six months later.

The base figure is 116.2, the June 15 figure. One cent increase will be awarded if the figure climbs to 116.6, or 0.4 points higher. From then on, adjustment steps are 1¢ per hr at alternating 0.5 and 0.4 points.

## TESTING: Equipment Makers Resent Slur

**BDSA report arouses ire of electronic testing equipment makers . . . Procurement policy of military may cut off best supply sources . . . Meanwhile, civilian demand booms—By K. W. Bennett.**

◆ THERE IS A small but growing controversy over purchases of electronic testing equipment by the armed forces. If the signs are right, the argument is scheduled to get hotter and larger in the months ahead.

Spurring the discussion is a recent BDSA report which stated flatly that the services are getting some testing equipment that isn't up to generally accepted commercial standards, and that the electronics testing industry is not being built up to the mobilization level that would be required in a national emergency.

### It's Big Business

Testing equipment of the general purpose military-type is not a small potato. There are 262 producers in the testing equipment field, and last year they did about \$10,000,000 in military business. This total does not include large sums spent for specialized testing equipment, built to order. Back in 1952 they did \$35,800,000 in military business for general purpose testing equipment, and the military total has been shrinking every year since.

There is the rub, according to electronics men. Civilian electronics equipment demands are booming. Sylvania President, Don Mitchell, has estimated that in 1956 electronics sales generally will total \$10,800,000,000. The use of general test equipment has been growing at the same pace. Military procurement of general use test equipment was an estimated \$10,000,000 last year (BDSA estimate) while its believed that electronic testing equipment going into the civilian market was conservatively worth \$170,000,000.

The 51 first-line producers of

electronic test equipment (general purpose) for military use who built probably 75 pct of military needs in the Korean emergency, and who themselves are about 50-60 pct small business firms, are losing out in military bidding to even smaller firms which have cut their hide to the bone. The old line producers are filling up their lines with civilian work.

### Where's the Danger?

The electronic testing equipment manufacturers are doing very little complaining. Their business generally runs from 20 pct to 50 pct over a year ago, depending on the company and product. And they are selling considerable amounts of specialized testing equipment, much of which is going

into the still booming guided missile and aircraft programs.

The loss, it would appear, is in the draining away of skilled manpower engineering personnel, and production techniques as responsible producers of general purpose military-type test equipment turn their facilities over to stronger civilian markets. As one manufacturer put it recently, "If war comes, we'll overnight be switched in 90 pct of our production to one type of meter. But in the meantime, we haven't got the military order for that type of meter in the plant."

Test equipment, like machine tools, could be a critical area in a national emergency. And military buying policies seem to be discouraging the producers.

## How Confused Buying Hurts

◆ THE RESULTS are painful, to both the Armed Services and to responsible bidders. In one case, the losing bidder lost a contract proposal for manufacture of a general-purpose testing meter. The company was already producing the meters for a civilian account and for another Armed Service branch. With engineering done, with production lines already in operation, the company figured costs carefully, figured theirs had to be the low bid.

But the contract was parcelled out to the lowest bidder, with the contract officer explaining that the successful bidder had a good financial rating and he could do nothing else than accept the lowest bid. The low bidder defaulted

the contract. A second low bidder made at least a start in getting into production, but had to quit, and now the government is back calling on the original producer requesting that he rush delivery, that he take the contract.

He can do neither. He's filled up his lines with additional business.

In another case, the prime source of a general purpose test meter for Army use was bypassed as the Army sought a second source, and bit at a low bid. The new contractor defaulted over a period of four years, consuming Government money without producing meters in the meantime.

There are many more, equally frustrating cases.

## APPLIANCES: Easy Living Hits New High

Unprecedented demand for electrical appliances has manufacturers producing at record pace . . . More companies are going in for a wider range of products . . . Looks like 1956 will be another banner year.

• THE HOUSE-HUNTING young couple were sold on the sample home. Included in the price were an electric range and an automatic washing machine. But the wife wanted an automatic drier and a new refrigerator to make her kitchen complete. Chances are, she got her way.

Multiply this family scene by thousands and you have part of the reason why shipments in the electrical appliance industry this year will reach an all-time high.

First returns from the 1954 Census of Manufactures point up the appliance industry as a major ground gainer in the years between 1947 and 1954, particularly

small appliances. And the returns do not include radio and television production.

### More New Firms

Estimates show 1955 was 14 pct better than 1954 and that shipments by the industry this year are likely to top 1955 by 6 pct. The Census suggests that home appliance manufacture has gone through some violent growing pains, not all of which are part of the dead past.

A staggering 68 pct gain in value of products shipped between 1947 and 1954 was accompanied by an influx into the industry of firms seeking diversification. The

number of establishments increased from 389 in 1947 to 421 in 1954.

The number of persons employed by the industry in 1947 was 72,500. But in 1954 the total dropped to 71,100. This 2 pct decrease in employment came about despite the substantial gain in value of shipments. In 1947, shipments totaled \$906.5 million, while in 1954 it was \$1322.8 million. By the end of this year, shipments probably will reach \$1627.0 million.

### Competition Rugged

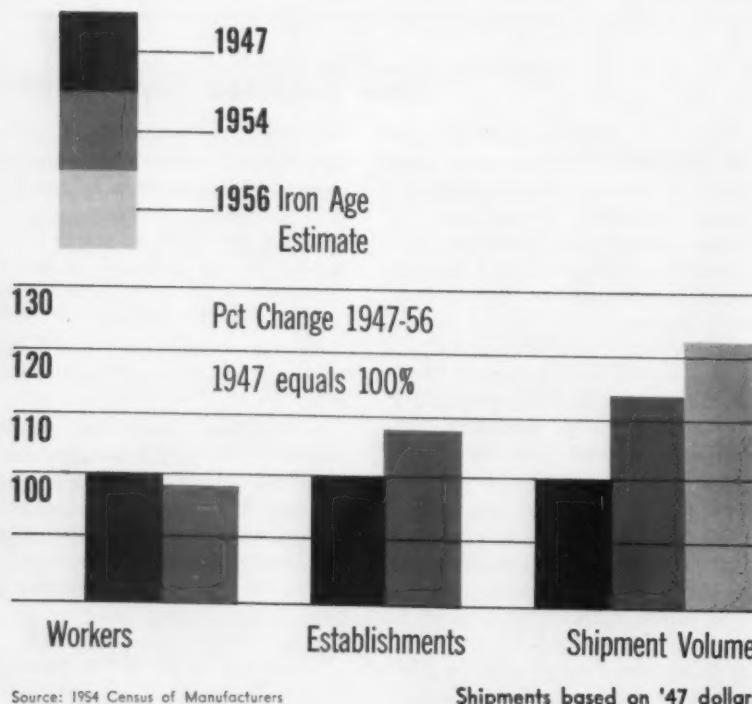
At least 10 pct more of the total value of shipments in 1954 were made by types of companies not included in the Department of Commerce "electrical appliances" classification.

The report reflects the growing demand by distributors that manufacturer supply not only ranges, water heaters, and other equipment in the original classification; but that he also supply refrigerators, freezers, home laundry equipment, and other appliances under the same brand name.

When the customer comes in, the distributor wants to offer him a complete houseful of appliances right up to and including air conditioning. It is a growing market, but a highly competitive production picture.

As it expands the number of appliance types sold under a single brand name, the industry is reducing employment and stepping up mechanization of manufacturing methods.

### Growth In Appliance Industry



Source: 1954 Census of Manufacturers

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## EXPANSION IN INDUSTRY

### Aluminum:

#### Olin, Revere enter field with a new company.

The Olin Revere Metals Corp. will be the fifth producer of primary aluminum in the U. S. The new company, formed and owned equally by Olin Mathieson Chemical Corp. and Revere Copper and Brass Inc., will have annual capacity of 180,000 tons of aluminum.

New facilities to be constructed include a 350,000-ton alumina plant on or near the Gulf Coast; a reduction plant at Clarington, O.; and two 225,000 kw generators owned by a wholly owned subsidiary of Olin Revere but operated, along with a third, by the Ohio Power Co.

This setup replaces the original plan of Olin Mathieson under which the chemical company had intended to build facilities to turn out 60,000 tons. The Certificates of Necessity covering this have been transferred to the new corporation by the ODM.

Cost of the venture is estimated to be about \$231 million. Bank loans and loans from insurance companies account for \$200 million, with Revere and Olin each putting up \$15.5 million.

Bauxite will come from the Surinam, Dutch Guinea mines of N.V. Billiton.

Contracts currently call for Olin Mathieson to get two-thirds of the output, with Revere taking the remainder. Half of O-M's aluminum will be fabricated at a new rolling mill to be built near the

reduction plant and the rest in Midwest and Farwest plants.

Revere will use part of its allotment in the sheet, tube, and extruded shapes depts. of the Baltimore, Md., plant, and the rest at the new plant in Chicago.

President of the new corporation will be Walter F. O'Connell, who will continue as executive vice president of O-M's aluminum program.

### Expansion Briefs

**Admiral Corp.**, Chicago; new 40,000 sq ft building for storing and servicing refrigerator systems at its Galesburg, Ill., plant.

**Warner & Swasey Co.**, Cleveland; will construct housing for additional manufacturing space, and acquire more machinery and equipment; spend about \$2.8 million.

**U. S. Borax & Chemical Corp.**, Los Angeles, Calif.; will build new research laboratory, Anaheim, Calif.

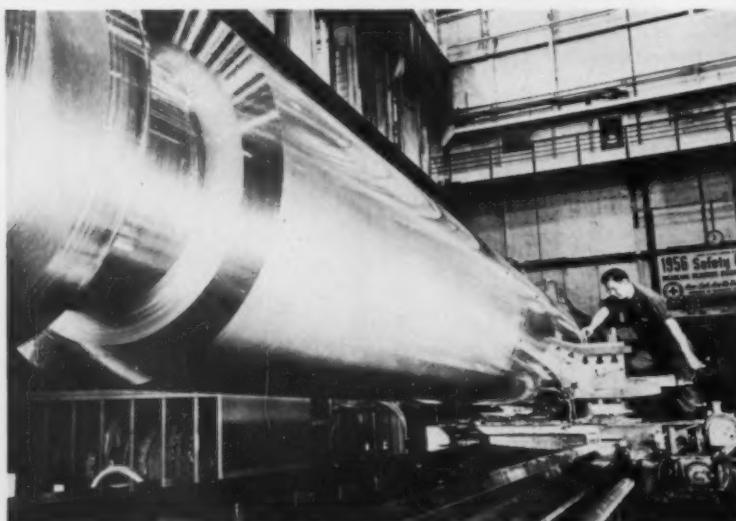
**Industrias Kaiser Argentina**; completed negotiations with Giuseppe Vianini, Italian manufacturer of gear equipment, for investment of gear equipment in excess of 20 million pesos.

**Industrial Tectonics Inc.**, building a new western division plant in Compton, Calif., to manufacture antifriction bearings; scheduled for completion in December.

**IBM World Trade Corp.**, N. Y.; established the first data processing center in Switzerland, at Zurich.

**Solar Aircraft Co.**, San Diego, Calif.; plan to expand the Des Moines, Iowa, plant by 25 pct.

### 30-Ton Rotor Shapes Up at Schenectady



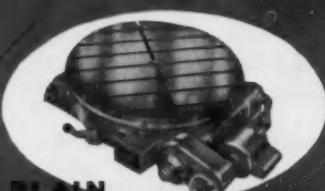
A LOT MORE TURNS will be taken by this huge cylinder after it is completed by machinists at General Electric's Schenectady, N. Y., plant. It is destined to become a rotor for the first steam turbine-generator to be installed at Virginia Electric and Power Company's new, \$24 million Yorktown plant. It will supply power for 250,000 persons.



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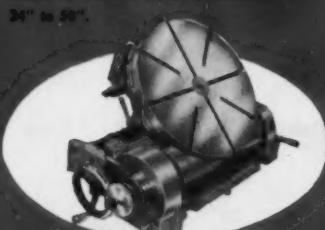
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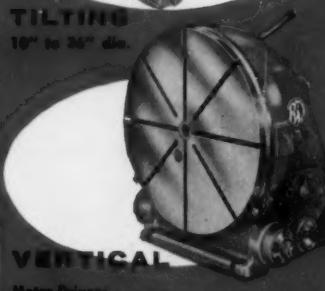
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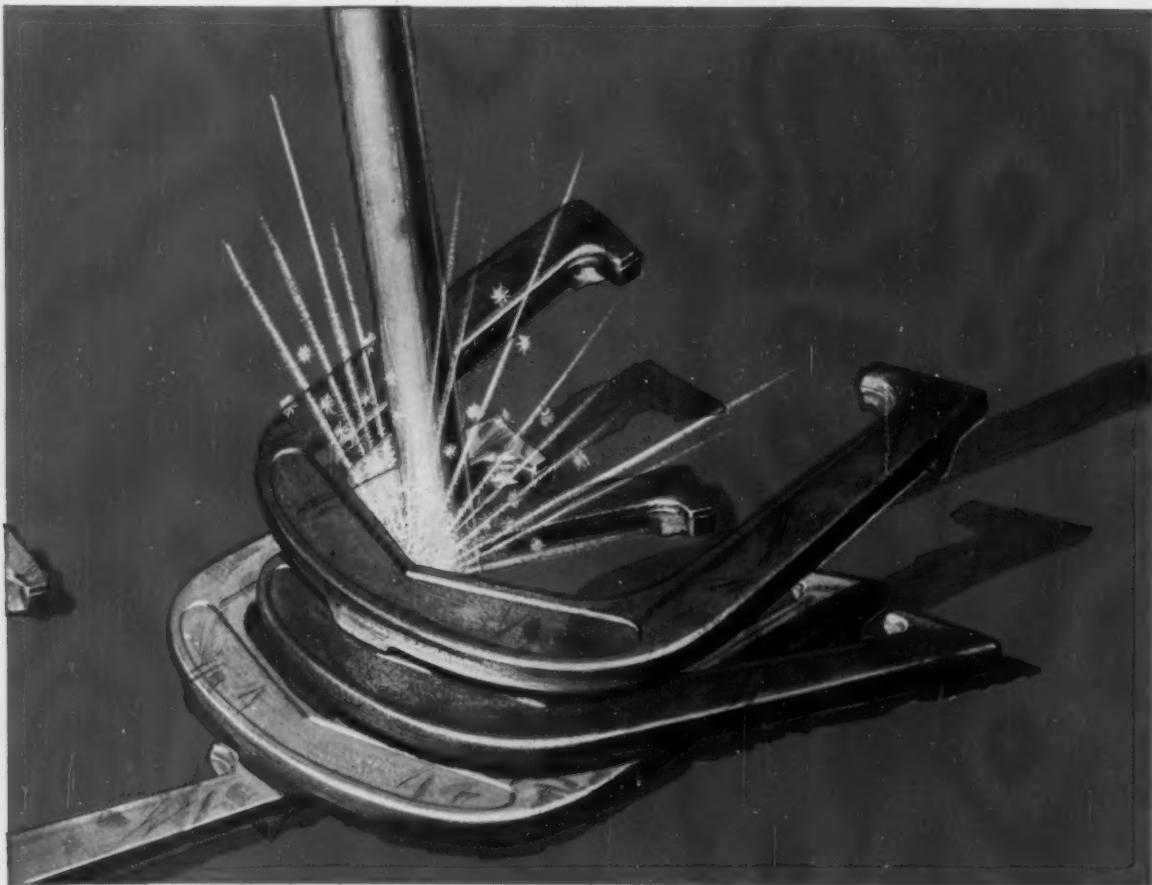
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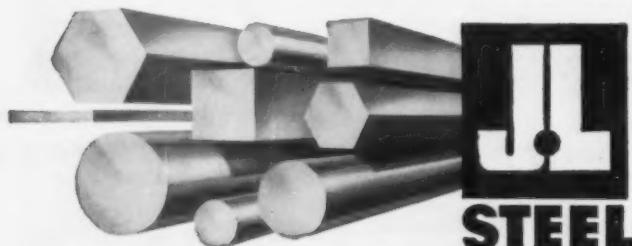
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PITTSBURGH, PA., AND HAMMOND, IND.

## REPORT TO MANAGEMENT

**The Second Quarter Question Mark**

You can count on a continued high rate of business through the end of this year and well into 1957. But the second quarter of next year will run into some obstacles that raise a certain amount of uncertainty.

It scarcely bears repeating that consumer durable goods, notably cars and appliances, barely held up their end of the 1956 economy. Instead, expenditures for capital goods and equipment carried the load.

Now these same products create the problem for next year. There isn't much doubt but that the re-styled 1957 cars will go over big, at least well into the first quarter of next year. After that, a lot depends on what they call in politics "the imponderables."

**What Affects Auto Sales?**

The sales pattern of 1957 cars depends on a number of factors. Some, fortunately, tend to indicate sales of the 1953 or 1955 pattern.

The new stylings are the big thing. Although the faceliftings of 1956 models were more significant than has been the rule in a facelifting year, they just didn't take. But best informed word from Detroit is that the 1957 cars really have it, in both appearance and engineering advances.

Something else to consider is the two-year cycle of "trading in" that has become the pattern for so many car owners. Whether rightly or wrongly, it's a common belief that two years is the most economical interval to keep a new car.

As a result, those who bought 1955's, and there are a record number, are going to be tempted to go back into the market with the 1957's. Of even more importance is the general high level of prosperity and record earnings enjoyed the past two years.

**Why all the Concern?**

Against these bullish factors are two important things: tighter consumer credit and higher prices. These are things the prospective buyers of cars and appliances will have to face in the next year's models.

Appliances have already started their upward climb, with most producers already on record as increasing prices from 4 to 10 pct. While automakers have not tipped their hand, it is known that 1957 prices will be substantially higher.

Added to that, it is tougher to make a "deal." Automakers learned their lesson in 1955 and aren't forcing cars on their dealers as they did in that record year. While that may be in the best interest of the industry in the long run, it won't help sales in a given period.

There are two sides to the credit picture, both bad. It will be more difficult for a 1957 car buyer to finance his car. He will have to be a top credit risk, won't be able to stretch his financing over a long period.

At the same time, the too easy credit of 1955 may linger on. Anyone buying a car on a "balloon note" or some of the other extremes in easy financing, may not have his car paid for now. No new car for him.

**Watch the Scrap Market**

Prices of steelmaking scrap are now at an all time high, with price of No. 1 heavy melting steel flirting with \$60 in major market areas; well over that in at least one consuming area.

A year ago, Economist Eliot Janeway predicted \$60 scrap in view of a world wide scrap shortage. (And he was roundly criticized from some circles at the time.) Today, the possibility of \$80 scrap (for prime industrial grades that demand a premium) is mentioned by Mr. Janeway.

## INDUSTRIAL BRIEFS

**Hot Time in Cleveland . . .** Newest developments in the application, control and safe operation of protective atmosphere furnaces will be reviewed by the Industrial Heating Equipment Assn. under the auspices of the American Society for Metals at the National Metal Congress & Exposition in Cleveland, October 9th.

**Pound of Cure . . .** Jones & Laughlin Steel Corp. is constructing a new Health Center at its Pittsburgh Works, with completion scheduled early in 1957. Estimated cost is approximately \$400,000. The contract has been let to Dick Construction Co., Pittsburgh. Architects were Marlier and Johnstone, Pittsburgh.

**Hurricane Slide Rule . . .** A robot "Hurricane Inspector" is being built by Gulf Oil Corp. and is believed to be the first sleuth, either human or electronic, in marine history to scientifically measure the forces of waves, winds, tides, and currents in the open sea and in water depths over 100 feet.

**Comprenez-Vous? . . .** Vanadium-Alloys Steel Co., Latrobe, Pa. entered into an agreement with the Compagnie des Forges de Châtillon, Commentry et Neuves-Maisons with home offices in Paris. The new company, specializing in high speed and tool steels, will be known as the Societe Commentryenne Des Aciers Fins Vanadium-Alloys.

**Loop the loop . . .** Walter Kidde Nuclear Laboratories, Inc., was awarded a contract by Curtiss-Wright Corp., Wood-Ridge, N. J., to design, build and operate a water loop test facility at Garden City, L. I. The facility will be used to investigate heat transfer, vibration, glow distribution and other technical problems con-

nected with the Curtiss-Wright's nuclear propulsion for aircraft program.

**By Acclamation . . .** The number of industrial users of radio-active isotopes has increased more than 500 pct within the past five years, according to a survey by the Atomic Industrial Forum. The report shows more than 1000 industrial organizations in the U. S. are now using atomic energy by-product materials in 1347 different installations.

**Keep the Powder Dry . . .** The Luria Engineering Co., Bethlehem, Pa. has completed construction of two steel buildings at Parlin, N. J. for the Hercules Powder Co., Inc., Wilmington, Del., manufacturer of chemicals and explosives. Structures are part of the \$10 million new plant, earmarked for the production of industrial and household items.

**For Crew Cuts . . .** A science education program designed to encourage more of America's youth to follow a career in science is being offered by the Manufacturing Chemists' Assn., Inc. The program, for a five-year period, will cost an estimated \$1 million and will include work at elementary, high school, and college levels.

**Alps to the Ganges . . .** Brassert Oxygen Technick A. G. of Zurich, Switzerland, has completed negotiations on a general license agreement with the Government of India to extend the steel industry of that country through the use of the Oxygen Converter Process. The process is a new method of making steel in which Kaiser Engineers Div. of the Henry J. Kaiser Co. is the exclusive licensor in the United States.

**PffffT . . .** More than \$1.8 million contract for the manufacture of thousands of steel supersonic practice bombs has been awarded to Pastushin Aviation Corp., Los Angeles. Designated Mark 88, the practice bomb is the first of the Navy's high speed bomb shapes to be mass produced for drill purposes. It will be built by the Pastushin Company from designs of the Navy Bureau of Ordnance.

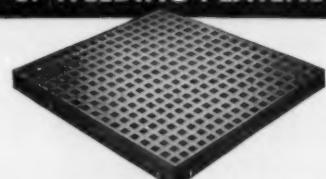
**New Field in Plainfield . . .** Burroughs Corp. has formed a new Electronic Tube Div. in Plainfield, N. J. The new division will occupy the Plainfield plant of Haydu Bros. of New Jersey, Inc., formerly a Burroughs subsidiary.

**new amazing extension probe flashlight**



**U. S. ELECTRIC MFG. CORP.**  
222 W. 14th St., New York 11, N.Y.

**BENDING BLOCKS  
or WELDING PLATENS**



4 ft x 4 ft—5 ft x 5 ft—5 ft x 6 ft. Also other sizes. Cast steel blocks for layout, welding & assembly. Tools, stands & accessories. Write today for information.

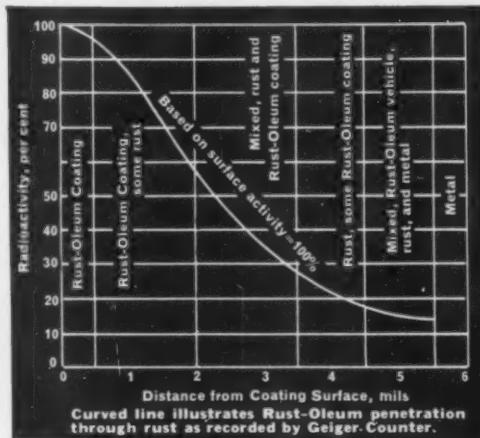
**ACORN IRON & SUPPLY CO.**  
Chestnut Ave., & Fisler St., Philadelphia 23, Pa.

# RUST-OLEUM.

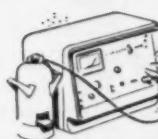
# PENETRATION

**through rust to bare metal traced by Geiger Counter.** To effectively stop rust—the vehicle of a protective coating, when applied over a sound, rusted surface—must penetrate through the rust down to bare metal. **Rust-Oleum does exactly that!—as proved by radioactive research!** Rust-Oleum's specially-processed fish oil vehicle was radio-activated and formulated into Rust-Oleum 769 Damp-Proof Red Primer—then applied to rusted test panels. Penetration *through rust to bare metal* by Rust-Oleum's specially-processed fish oil vehicle was then traced by Geiger Counter.

You stop rust, because Rust-Oleum's fish oil vehicle soaks deep down to bare metal and into the tiny pits where it drives out air and moisture that cause rust. You save, because this same penetration enables you to apply Rust-Oleum directly over rusted surfaces—usually eliminating costly surface preparations. Attach coupon to your letterhead for your thirty-page report entitled, "The Development of a Method To Determine The Degree of Penetration of a Rust-Oleum Fish-Oil-Based Coating Into Rust On Steel Specimens," prepared by Battelle Memorial Institute technologists.



There is only one Rust-Oleum. It is distinctive as your own fingerprint. Accept no substitute. Buy—and specify only Rust-Oleum. You'll be happy that you did.



Rust-Oleum is available in practically all colors, including aluminum and white.

Your nearby industrial distributor maintains complete Rust-Oleum stocks for your convenience.

# RUST-OLEUM.

## STOPS RUST!

See our Catalog in Sweets, or write for complete information.



ATTACH TO YOUR LETTERHEAD—MAIL TODAY

Rust-Oleum Corporation  
2560 Oakton Street  
Evanston, Illinois

- Complete literature including color charts.
- Thirty-page report on Rust-Oleum penetration.
- Nearest source of supply.





## Hopes High For 4th Quarter Comeback

**Prophets see healthy signs in production outlook as purchasing agents vie for sheet steel inventories . . . Major model changes provide ammo for big sales guns . . . Labor costs will go higher—By T. L. Carry.**

WITH THE FIRST 1957 models rolling off the assembly lines this week, auto builders added up the 1956 score and estimated 4 million cars produced in 1956. It's the industry's eighth round of an output level that high.

But after the booming output of 1955, it was not a strong showing. Ford, Studebaker, and Plymouth have already shut down to begin the switch to next year's models.

Speculation as to the total extent of automotive raw materials in inventory ran rampant, ranged from zero to "heavy raw steel inventories."

But the fact remained that automotive men were continuing to talk one of the highest fourth quarter production levels in the nation's history, marked by the

fact that canny purchasing agents were booking all the hot-rolled and even all the cold-rolled sheet steel they could get their hands on.

**First In, First Out . . .** Lincoln appears to be leading the change-over parade, despite earlier reports that at least one General Motors Div. planned to be number one on the new-model-in-production list. Lincoln closed out production of '56 models as of the end of July, has announced early that it will schedule first 1957 model production beginning this week.

The major changes expected in the 1957 auto line come as welcome sales ammunition to distributors fighting increasing prices and tightening credit.

On the debit side of the 1957

auto sales ledger, was the fact that even before production began, it was apparent that a 4-cent hourly wage boost would be required for 1 million auto workers under current wage escalator clauses tied to the rising cost-of-living. Generally, the boost in labor costs will arrive on or about September 3.

**Prophets of Boom . . .** Until this week, the auguries for 1957 car sales have been increasingly bright. Oldtimers recall that the recent sales increase reported by Nash and other producers reflects almost exactly the picture back in late-summer 1954, when the automotive industry, with only this small handful of prophets crying in the wilderness, took off for an all-time record year.

Certainly automotive men, who have been proclaiming a brisk fourth quarter 1956 for at least a month now, are strong on the long range outlook. C. R. Beacham, general sales manager of Ford Div. of Ford Motor Co., went on record last week as saying that in 1957 the American output of goods and services "will reach an all-time peak, about 4.5 pct above this year, and near a total of \$428 billion."

For a nation that has been striving to crack the \$400 billion general economy level, the gain is startling, particularly in view of the uncertain credit outlook for late 1956 and early 1957.

**Moving Upstairs . . .** Mr. Beacham goes on to indicate that 9,500,000 annual car sales total seems in the cards for the future, though

### Does Quench Zone Befog the Ozone?

**Gasoline engines in the process of decelerating are responsible for about one-third of the hydrocarbons which form part of the smog that clouds many an otherwise sunny city.**

The question puzzling engineers is: Where do the other two-thirds come from?

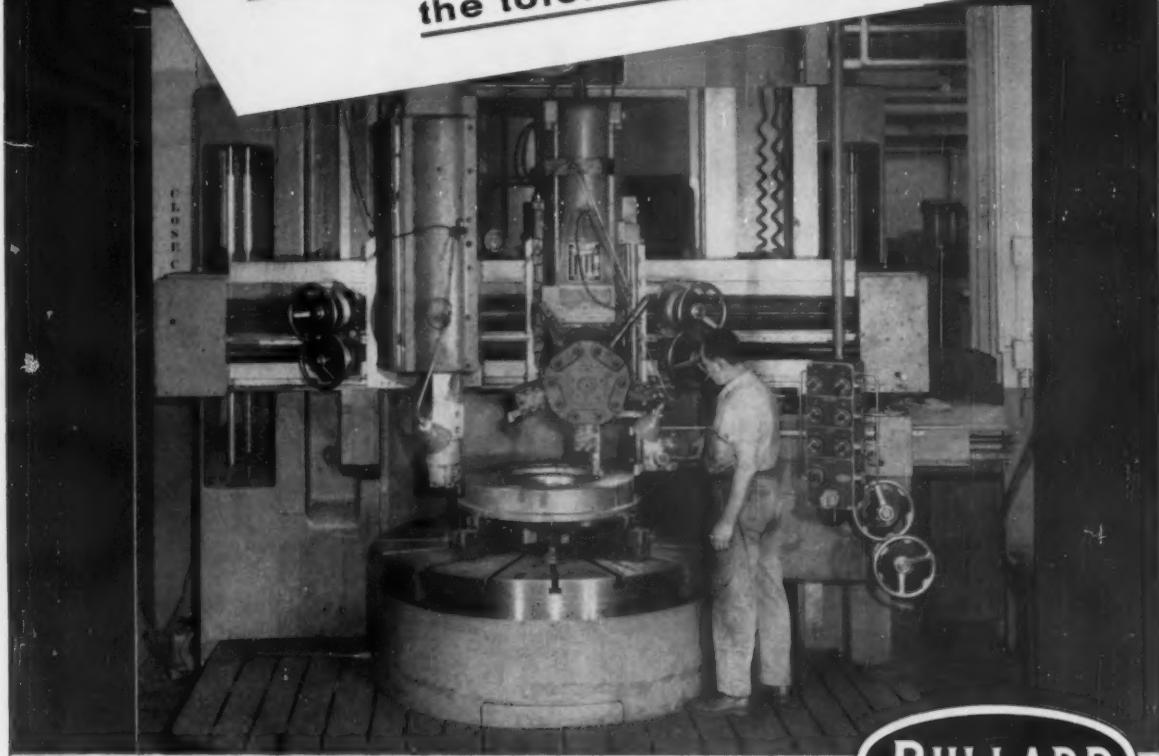
A fresh clue is provided by a General Motors staff engineer, Wayne A. Daniel, who points an accusing finger at your car's "quench zone"—a thin layer of unburned gasoline that forms on the relatively cool cylinder walls of a gasoline engine in operation.

The layer, from .002 to .015 in. thick, exists whether the engine is accelerating, decelerating, or cruising.

GM technicians cut a quartz window in the head of a test engine, photographed cylinders in the firing cycle, and spotted the layer in each cycle.

Mr. Daniels doesn't blame the quench zone for all the remaining hydrocarbons in smog, but says it probably accounts for a considerable portion. Next step is to observe the phenomenon under all types of engine operating conditions.

**"Few machines would hold  
the tolerances required"**



**BULLARD**

This statement by Mr. R. P. Feiser, Industrial Engineer of the York Corporation, York, Pa., is one of the reasons for their purchase of a 66" Cut Master, V.T.L., Model 75 for the machining of a rotor support for their turbomatic compressor.

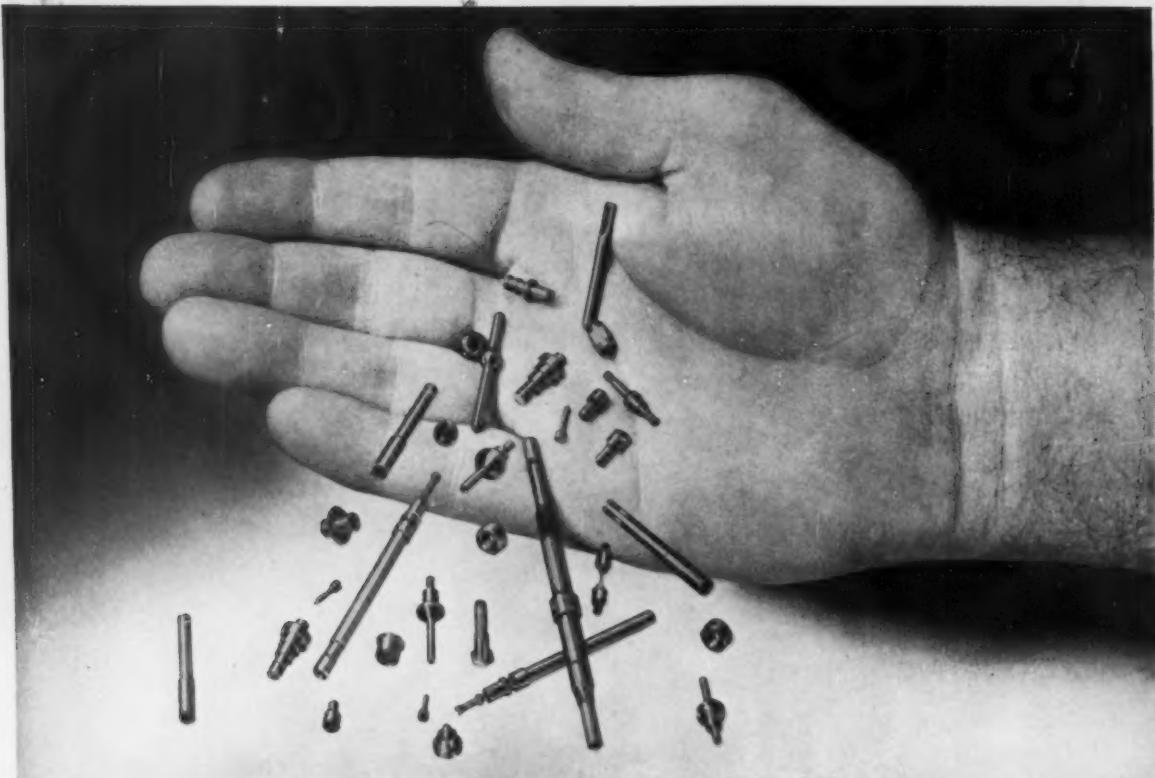
Mr. Feiser further states that "the 66" Cut Master does this machining at a saving of 40% over any previously used machine. In addition, the pendant control and power swiveling turret head are a great convenience in operation — the result is a low operator fatigue factor. Also, the York Corporation has experienced low maintenance costs on a 60" Vertical in operation since 1928 and a 36" Vertical in operation since 1937."



*How about you?*

Are you employing these same  
advantages to your machining problems?  
If not, may we recommend that you get the complete Cut Master  
V.T.L., Model 75 story by calling your nearest Bullard Sales  
Office, Distributor or writing for a catalog to

THE  
**BULLARD**  
COMPANY  
BRIDGEPORT 9, CONN.



## Do small parts like these give you large problems?

**Anaconda Rod solved costly production problems  
for G & F Manufacturing Company, Philadelphia**

The trend toward miniatures has led to a tremendous increase in the use of small precision parts like these. And this has placed a heavier burden on the screw machine operator and the buyer of rod. Uniformity of alloy and dimension in batch after batch of screw machine rod is vital for economical production.

**ONE COMPANY'S PROBLEM:** The G & F Manufacturing Company of Philadelphia specializes in automatic screw machine production of minute parts, finished to precise dimensions. This company was experiencing costly production delays with the rod they were using, due to jamming and freezing of the rod as it was fed into the machines.

**THE SOLUTION:** Then G & F tried Anaconda Free Cutting Brass-271 Rod in the diameters required for their type of small-part production. They found it highly satisfactory. Down time, due to jamming or freezing of the rods, has been practically eliminated and production schedules are com-

pleted without costly interruption.

Whether for small parts of extreme accuracy—or for ordinary screw machine production—The American Brass Company can furnish free-cutting copper and copper-alloy rods fabricated to meet the requirements of the operation—uniform in length, diameter, temper and composition.

**FREE TECHNICAL SERVICE:** It is the function of the Technical Department of The American Brass Company to assist metal users in the solution of special problems. This service is at your disposal without charge or obligation.

Comprehensive data on composition and machinability of standard Anaconda Alloys, standard specifications, weights and dimensions of standard rods is available in Publication B-3. For this booklet—for special technical assistance—write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

5482

### **ANACONDA® RODS FOR SCREW MACHINE PRODUCTS**

## Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS
SEPT. 1, 1956*	63,501	19,000
AUG. 23, 1956	69,571	19,232
SEPT. 3, 1955	83,438	16,118
AUG. 27, 1955	131,848	20,881

\*Estimated. Source: Ward's Reports

just exactly how far in the future, Mr. Beacham didn't specifically say. But he did say "increased amount of spending money in the hands of the average man next year will give him a standard of living about 60 pct better than his father had 30 years ago."

At least some citizens will be handling a slightly increased income, as a direct result of the wage escalator mentioned above, as early as September, when first escalator payments will begin.

The upward inching of new car prices, along with increasing tightness of credit among some of the big independent automotive financing firms, coupled with rising interest rates in the past two weeks, are selling hurdles that are beginning to offset the high level of personal income that has been expected for the average car buyer in the closing months of 1956 and the opening months of 1957.

Whatever the case, it's been a 4 million car year, and after the booming levels of 1955, it's no great cause for cheering. Indicative of the problems ahead was the confirmation of reports of troubles passed. Studebaker-Packard Corp. confirmed that the slow selling spell of 1956 had resulted in a \$35 million loss. For Studebaker-Packard the first six months of 1956 amounted to a \$106 million falloff from the levels obtained in first half 1955.

## 1957 Packard Okayed

Weeks of speculation on whether the 1956 Packard would be the last was ended when Studebaker-Packard Corp. announced that a 1957 Packard will be produced at the company's South Bend, Ind., plant.

The new model is scheduled for

production in December and probably will be introduced to the public at the Chicago automobile show in January, according to Harold E. Churchill, S-P's new president. However, space is being reserved at the National Automobile Show in New York, Dec. 8.

Support for the 1957 Packard plans was received by Churchill from franchised distributors during a meeting of the Packard-Clipper Dealers Council.

## AUTOMOTIVE NEWS

the industry will need at least 40,000 young automotive engineering men in the next decade.

Citing free-wheeling, introduced by Studebaker in 1931, as an example of the type of engineering breakthrough that could open the way for overdrive and modern automatic transmissions, Hardig pointed out that 25 years ago there were more automobile companies, more small laboratories.

Nowadays, it would appear, it takes more manpower in the engineering category to produce the never-ending succession of engineering marvels that seem to be necessary to lure the buyer.

The need at the moment: to point out to young engineers the possibilities for improvement in today's already complex automobiles. Traffic control, reduction of the human element in driving, new body construction, braking methods, even new powerplants should be highlighted, Hardig feels, to lure young engineers.

## THE BULL OF THE WOODS

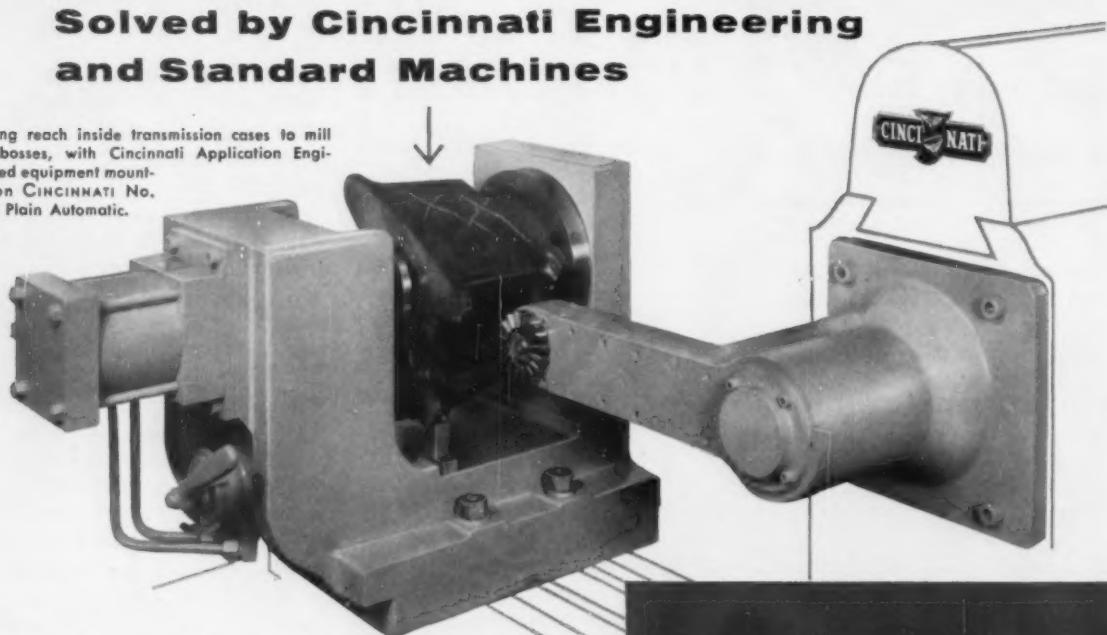
By J. R. Williams



# It's An Inside Job

## Solved by Cincinnati Engineering and Standard Machines

A long reach inside transmission cases to mill the bosses, with Cincinnati Application Engineers, long experienced in solving tricky machining operations, tooled up the inside job shown here with a long reach right-angle milling attachment mounted on a standard CINCINNATI® No. 1-18 Plain Automatic.



How would you reach deep inside a casting to machine bolt bosses? Cincinnati Application Engineers, long experienced in solving tricky machining operations, tooled up the inside job shown here with a long reach right-angle milling attachment mounted on a standard CINCINNATI® No. 1-18 Plain Automatic Miller. To reduce tiring physical effort, the work is held in an air operated fixture.

The 1-18's fast automatic table cycle, with a feed rate of 11 in. per min., keeps production going at a rate of about 100 transmission cases per hour.

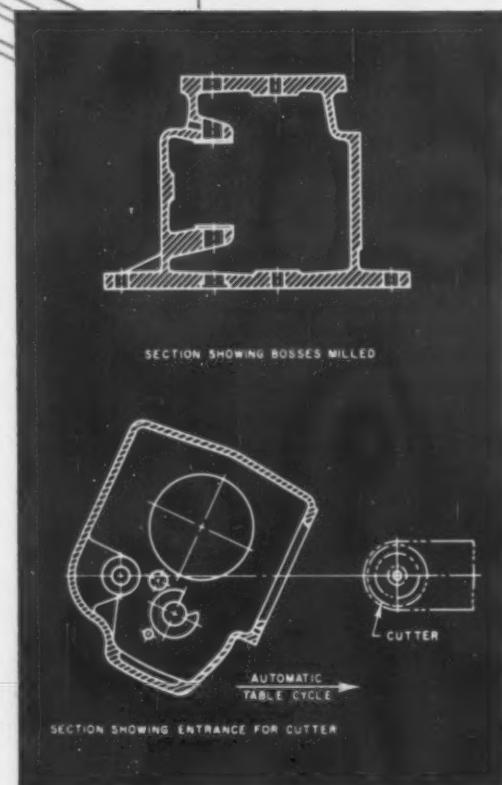
Although this is a rather simple setup, it illustrates what Cincinnati Engineering Service and standard Cincinnati Milling Machines can do for you. Here's a good point to consider for your next milling machine requisition: standard Cincinnati's range from  $\frac{1}{2}$  hp drive to 50 hp drive, and hundreds of sizes in between. You might like to learn more about the production pacemaker shown here, the No. 1-18 Plain Automatic. Ask for catalog No. M-1555-3, or look in Sweet's for brief specifications.

THE CINCINNATI MILLING MACHINE CO.

CINCINNATI 9, OHIO



CINCINNATI No. 1-18 Plain Automatic Milling Machine, Catalog No. M-1555-3.



# CINCINNATI



MILLING MACHINES • CUTTER SHARPENING MACHINES • BROACHING MACHINES • METAL FORMING MACHINES • FLAME HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID



## Can Huge Defense Program be Eased?

**Growing feeling in Congress is that expenditures must be cut soon . . . How to do it without injury to defense and to the economy is the problem . . . But de-emphasis seems to be needed—By G. H. Baker.**

♦ IT LOOKS LIKE Congress next year will try to grasp firmly one of the most prickly economic problems of this decade—namely, how the government should begin to back away from our huge (\$36 billion a year) defense program without either inviting enemy attack or without setting off a business recession or a major depression.

It won't be easy. But there's a growing belief among members of both political parties that it's got to be done. Some recent committee studies remind the Senate and the House members that no nation, including the United States, can continue indefinitely to devote more than half of its national budget to war or preparation for war.

**How To Do It . . .** To block this drift—or at least to slow it—Congress intends to find ways of de-emphasizing the current accent on planes and guns, and of replenishing the gap with new and better civilian-type goods and services. This is a ticklish problem. To slow down too rapidly the present rate of defense spending would be to invite disaster.

### Watch Issue Hot

The policy battle over whether the U. S. watch industry is or isn't an "essential war industry" isn't cooling off any. It's getting hotter. Problem is back in the spotlight again because of a new study being made for the Office of Defense Mobilization by George B. Beitzel, retired Springfield, Pa., industrialist. A final decision still

is weeks away. Either way the decision goes, some people are going to get hurt. There's some talk of a public hearing on the relatively high tariffs now imposed on Swiss watches. Such a hearing could produce plenty of fireworks.

### Tax Cuts Doubtful

Don't plan on general tax reduction next year, even though both political parties are promising sizable cuts for everybody. The relatively small (\$1 billion) surplus on hand at the Treasury is being eaten up by the higher cost of running the government. As a result, it's going to be necessary to keep tax rates at least where they are now.

Big-scale reduction, either for

corporations or for individuals, just isn't in the cards at this time. Regardless of what the politicians promise in the way of cutting government spending and reducing taxes, the government is finding that its costs, just like everybody else's, are rising and will continue to rise.

### Small Business Aid

Even if Congress does vote tax cuts next year, there's no assurance that President Eisenhower—assuming he is to be re-elected—will approve such legislation. He tends to favor tax cuts for smaller firms, but probably will veto any general tax reduction program, chiefly on the say-so of Treasury Secretary Humphrey. But outlook for smaller firms is brighter.

## Let's Cut That Government Paperwork

**■ Part of the burden of recordkeeping piled on the American businessman by the government is to be curtailed if a new White House instigated program has its desired effect.**

**The ten executive departments and independent agencies are directed to find means of reducing the amount of record filing demanded of firms handling government business.**

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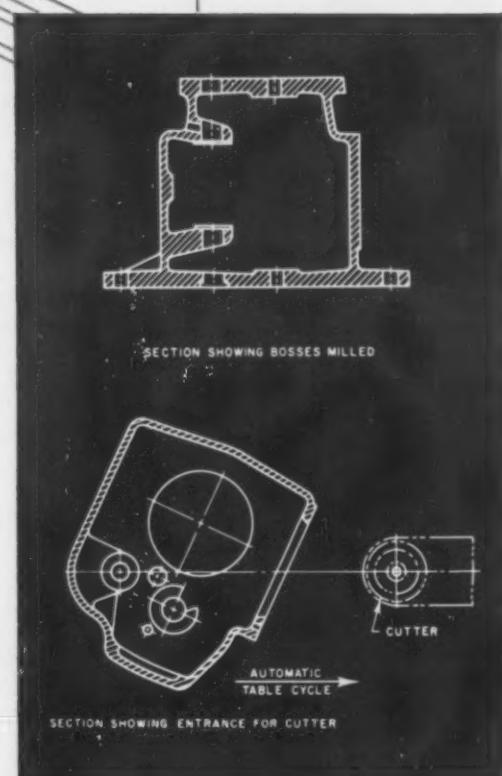
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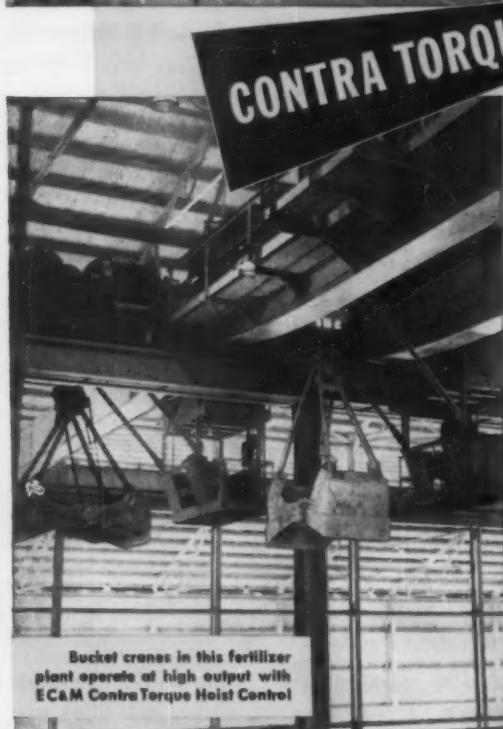
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Bucket crane of the Level-Luffing type  
operates speedily under EC&M Contra  
Torque Hoist Control



Bucket cranes in this fertilizer  
plant operate at high output with  
EC&M Contra Torque Hoist Control



**FAST GETAWAY!** Quickly responsive to the frequency of the induced-rotor voltage, EC&M FREQUENCY RELAYS match torque requirements to the load. They get the motor up to speed quickly for lowering the bucket and moving the trolley in or out. A lot of time saved between trips!

**WIDE SPEED SELECTION!** These relays permit starting-down on any master switch point. No waiting until last point is reached. Wider choice of speed gives greater flexibility in clean-up operations and speeds output!

**SMOOTH STOPPING!** When checking motor-lowering speed, weak torques are provided for light loads or the empty bucket; stronger torques for heavier loads. Trolley motor is stopped and reversed smoothly under frequency relay automatic operation!

**SPEED-LIMITING!** Safety on all speeds. These relays (one set for hoisting and lowering) automatically shift motor connections to safeguard lowering operation with far greater skill than human hands.



**SQUARE D COMPANY**  
EC&M DIVISION • CLEVELAND 28, OHIO

7407



## Who's Expanding in Farwest Industry?

Here's latest rundown on new West Coast firms and those enlarging facilities . . . Wide range of product interest is evident . . . Area forms good market for suppliers of tools, equipment and services—By R. R. Kay.

♦ **PEOPLE MAKE MARKETS** and markets make industry. The mass migration to the West Coast continues with no sign of letup.

Southern California alone gets over 1000 new residents a day. And it's been like that since 1950. Keen metalworking executives will know how to cash in on this day-by-day bigger market. Here's the latest rundown of new and expanding firms. Their plants need your machine tools, equipment, and services.

**What They Do . . .** Convair's new Astronautics unit will cost \$40 million. Half of it will go for special equipment including machine tools. The San Diego facility will make the Atlas ICBM (intercontinental ballistic missile). Carrier Corp. plans a \$6 million, 500,000-sq-ft plant at Puente (near Los Angeles). Products: air-conditioning equipment, furnaces, water heaters.

Air Reduction Pacific Co., Vernon, Calif., will put up a multi-million dollar liquefaction plant to supply oxygen, nitrogen, and argon to California, Arizona, New Mexico. The Ex-Cell-O Corp., Detroit, staked out 15 acres in Downey, Calif., for a 50,000-sq-ft plant. Firm makes aircraft parts and drill jig bushings. A. I. M. Steel, Ltd., New Westminster, B. C., earmarked \$200,000 for a new industrial equipment factory.

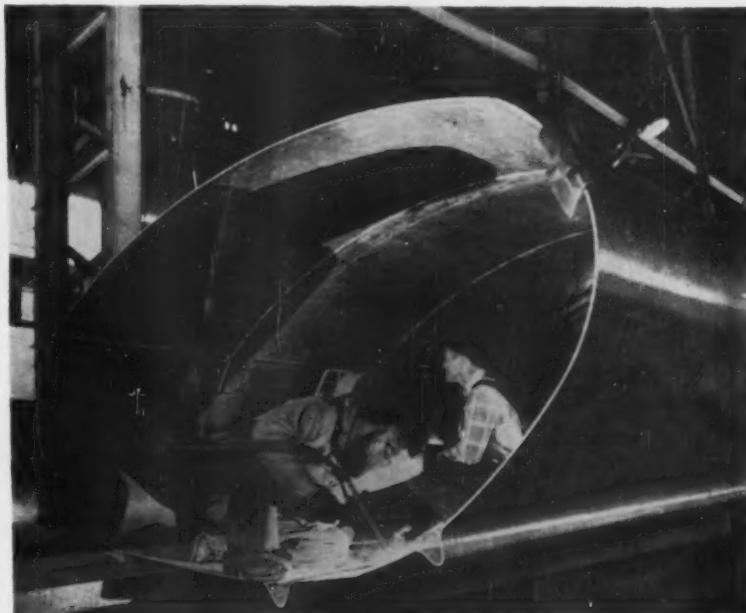
**Controls, Pipe, Foil . . .** Clark Controller Co., Cleveland, O., set up its first U. S. branch plant in Los Angeles. Firm makes indus-

trial electrical control equipment. American Pipe and Construction Co. bought 68 acres near Fontana, Calif., for expansion. The company is also putting \$200,000 into new equipment and remodeling of its Alvarado (San Francisco Bay Area) plant. Mick's Wrought Iron Safety Rail Co. opened its doors in Portland, Ore., for manufacture of wrought iron rails and columns.

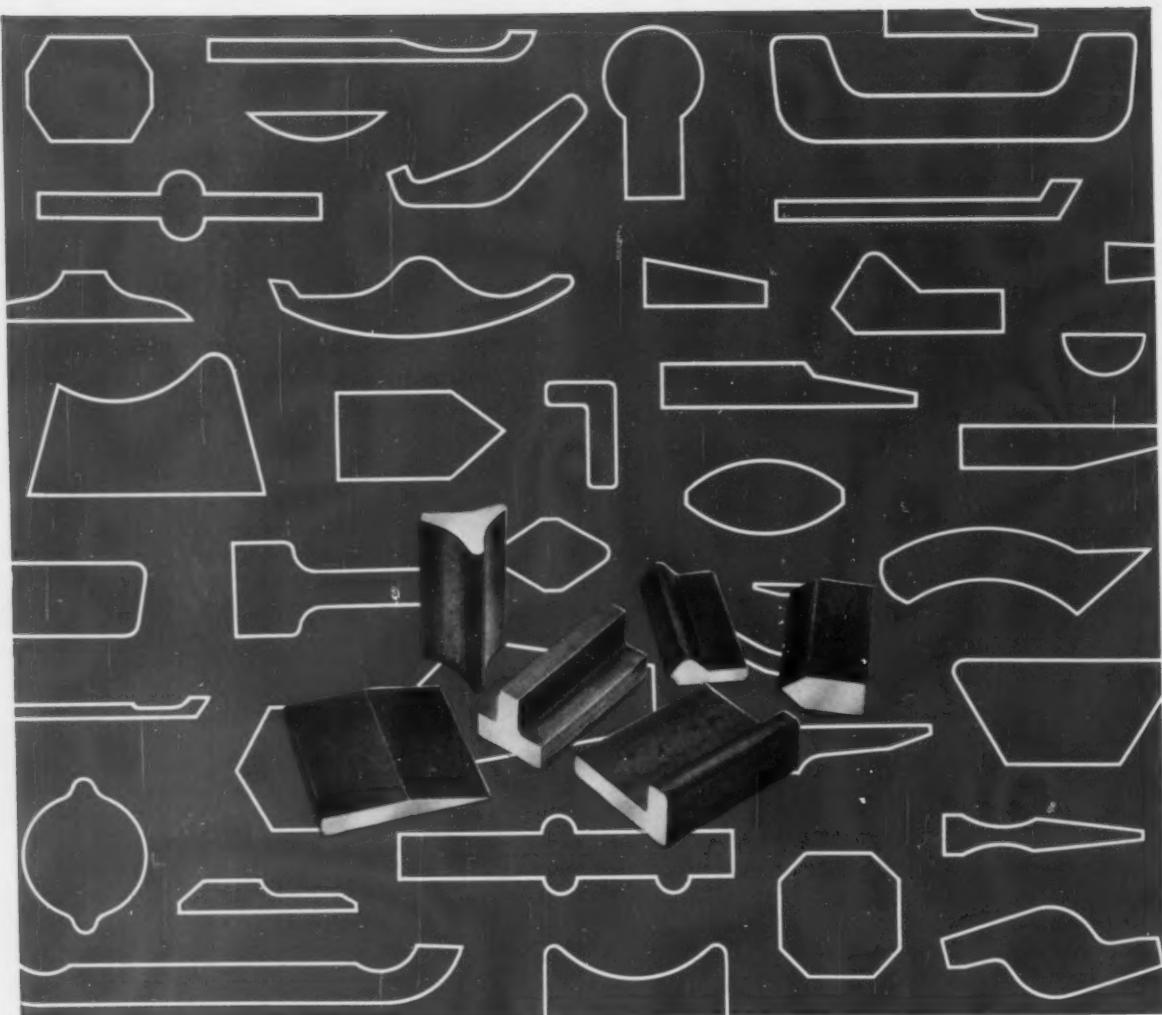
Foil Kraft Div. of Kaiser Aluminum & Chemical Corp., Los Angeles, is jacking up its production with new machinery and equipment. Plant makes rigid aluminum foil food containers. Can-

ada Wire and Cable Co., Vancouver, B. C., will spend \$500,000 for more steel cable manufacture. Superior Fireplace Co., Fullerton, Calif., hopes by year-end to be turning out heat circulating fireplace units, fireplace screens at its new \$150,000 factory.

**Missiles and Plating . . .** National Tapered Wings, Inc., Anaheim, Calif., is building a new 100,000-sq-ft headquarters and plant for aircraft parts and missile components. Camsco Foundry, Inc., Azusa, Calif., is now producing sprinkler parts.



**WELDERS APPLY TORCH** to one of first unfired pressure vessels to be built of Kaiser Aluminum's new, high strength aluminum alloy 5086. ASME recently approved the non-heat-treatable alloy for welded construction.



## Crucible special shapes for better alloy steel parts at lower cost . . .

If you're machining intricate sections from solid bars—or using expensive forgings—stop! Choose instead, a *Crucible special shape* that approximates the finished part. *Crucible special shapes* eliminate rough-machining operations . . . reduce scrap losses.

There's practically no limit to the *special shapes* available at Crucible, in a wide variety of

alloy steels. Rolls for over 400 special shapes are available—other shapes can be rolled to your specifications. Your local Crucible representative can give you the whole story of how *special shapes* can cut costs—save time. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

**CRUCIBLE**

first name in special purpose steels

**Crucible Steel Company of America**



## Button, Button, Who's Got The Reject?

**Careless handling big cause of machine shop rejects . . . Many wind up back in production line via someone else's totebox . . . Answer is more automatic materials handling—By E. J. Egan, Jr.**

♦ YOU DON'T hear much about it, but just plain careless handling is one of the biggest causes for parts being rejected in many machine shops. Substandard materials, faulty machines, inefficient inspection methods are 'way down on the list.

Prevention of this handling damage is the big reason behind the clamor for devices that not only load and unload machine tools and other equipment, but also transport workpieces.

Moreover, it's not enough for handling systems to also count, gage and store parts while treating them so carefully. These days they have to be made—well, let's say it—*sneakproof*.

Object is not so much to keep someone from "borrowing" a part out of the processing line. The average worker has little use for what is usually only a small component of a major end product.

**Sort of Game . . .** The big problem is to keep shop personnel from sneaking faulty or damaged parts back *into* the production setup. There seems to be a strong desire in many workers to bury their careless mistakes in somebody else's tote pan. In some plants the situation gets to be a sort of game, with entire shifts trying to outdo one another in passing the blame back and forth.

This is just one of the interesting things which one learns from a visit to Michigan Tool Co.'s new Gear-O-Mation plant in Detroit. The entire setup is devoted to designing, selling and

producing handling systems for continuous gear manufacturing lines. Most are equipped to turn blanks into finished gears, untouched by human hands.

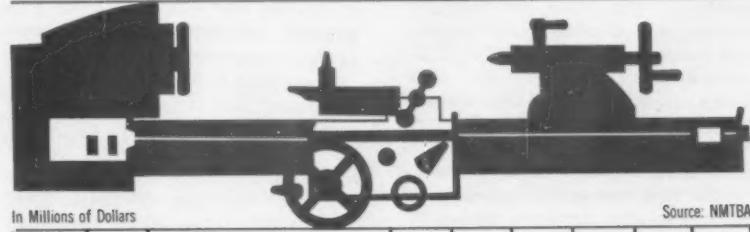
**Standard . . .** Popular feature of the firm's approach to automatic, controlled quality output is its adeptness at using a customer's existing standard machine tools. By contrast, many automatic set-ups need special equipment.

The fledgling plant has attracted a host of inquiries since it opened for business about a year ago.

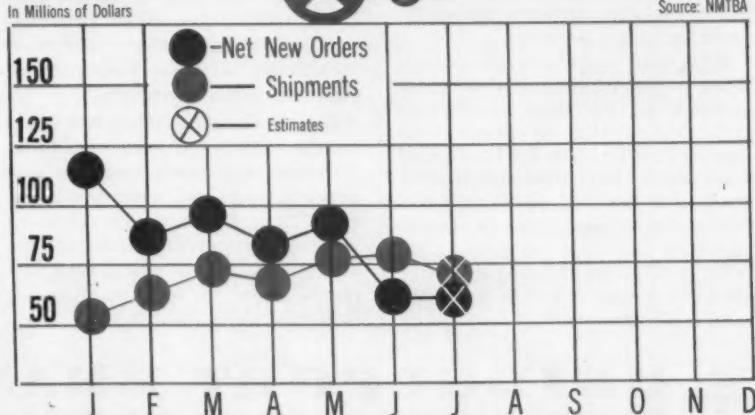
Gear-O-Mation management uses several approaches to keep costs of its handling and storage systems down. One is an "Erector-set" method of building the necessary conveyors, chutes, elevating devices and pedestal bases.

**Flexible . . .** All linkages can be expanded or contracted quickly and easily. This gives customers considerable flexibility in case of changes in part design or production requirements. Savings potential in this technique is particularly appreciated by mass producers of consumer goods.

Metal cutting types only



## MACHINE TOOLS 1956



# BRIDGEPORT BRASS COMPANY

# COPPER ALLOY BULLETIN

BRASS  
Bridgeport  
Co.

Reporting new developments in copper-base alloys and metalworking methods.

## Bridgeport Alloys Help Put Hot 'N Cold in New Fountain



The new "Vanishing Americans"—employees who leave the office for morning and afternoon coffee-breaks—cost business an estimated \$900,000,000 annually in lost time. To make coffee-time a pleasure and keep employees on the job, EBCO Manufacturing Company of Columbus, Ohio, has developed the Oasis Hot 'N COLD—an office water cooler that not only supplies cold water, but also dispenses piping hot water for instant beverages.

Bridgeport found material requirements for the hot and cold water tanks presented an interesting metallurgical problem; practically no camber is allowable since the tanks are roll-formed into cylinders and brazed together. The domes and bases of these tanks are drawn slightly and then are brazed together.

The metal supplied had to be *exactly the right temper* and with minimum camber. Bridgeport's Red Brass Alloy

#85 was recommended to meet these requirements and also to provide high strength, fine ductility and resistance to season cracking.

In addition to Red Brass Alloy #85, Bridgeport also supplies a variety of copper and brass items for use in the Hot 'N COLD and in EBCO's line of dehumidifiers. EBCO uses Bridgeport Tubular Plumbing—P-Traps, Cast Traps, Drain Tubes, Waste Tubes, Inlet Tubes, as well as Copper Fin stock, Red Brass Baffle stock and similar plumbing and mill products.

Each Bridgeport product is *matched exactly to the job it is expected to do*. This assures manufacturing ease, maximum economy and customer satisfaction. The same skilled technical advice...the same dependable source of high-quality metals are as near as your telephone. Phone or write your nearest Bridgeport Sales Office today.

### How to Braze Copper-Base Alloys

In brazing, the filler used is a non-ferrous metal and melts above 800°F but below the melting point of the metals being joined. On the production line and in the maintenance shop, four essentials are necessary for a strong bond:

**CLEANING.** Grease, oil, oxides and other foreign matter must be removed. Visual inspection will not detect all oxides; only filing, grinding or a bright dip will effectively remove oxides. Since it is nearly impossible to remove all traces of an acid-base flux in production work, such traces will cause future corrosion.

**FLUXES.** The main purpose of a flux is to protect parts with an air-excluding film since oxidation is increased rapidly when heat is applied. Fluxes should melt well below the melting point of the solder and should be stable at temperatures in excess of the melting point of the solder. Calcined borax and powdered boric acid are two commonly used fluxes.

**CONTACT.** Because brazing metal flows by capillary action, the parts being joined must be held closely together to allow the molten bonding material to flow between the parts. Clearances of .003 to .008 at welding temperature are recommended.

**TEMPERATURE.** Parts should be heated slightly above the melting point of the brazing material. A gas-air or gas-oxygen flame is normally used, although oxyacetylene torches can be used with care. Red heat is needed for this type of joining. Too high a temperature will burn off the flux and cause the metal to oxidize, weakening the bond. Use a reducing flame (excess of fuel in the fuel-to-air ratio) or a neutral one. In furnace brazing, a reducing atmosphere helps prevent oxidation and removes any oxide which may be left on the metal.

Bridgeport has a new Bronze Welding folder that's yours for the asking. Write today for your copy. (011)



**BRIDGEPORT BRASS**  
COMPANY • BRIDGEPORT, CONNECTICUT

Mills at Bridgeport, Conn.,  
Indianapolis, Ind., and Adrian, Mich.  
Sales Offices in Principal Cities—  
Conveniently Located Warehouses



## The Iron Age

## SALUTES

### **John E. Timberlake**

As vice president of Jones & Laughlin Steel Corp., he is the driving force behind the company's expanding sales campaign. His policies have encouraged growth of new metalworking industries.

To John E. Timberlake, vice president of Jones & Laughlin Steel Corp., the day just isn't long enough. A complete set of tools in the basement of his home hang in their racks with a heavy coating of oil protecting them from the rust of idleness. His collection of HO model trains rarely feel the vibrations of the transformer. A bag of gleaming golf clubs is stacked in a closet corner, gathering dust.

These are the hobbies that take a back seat to John Timberlake's favorite occupation—marketing steel. He is key man in Jones & Laughlin's gigantic sales effort, which must supply outlets for the company's expanding production. J&L leans heavily on his ability to gage and capture a growing market.

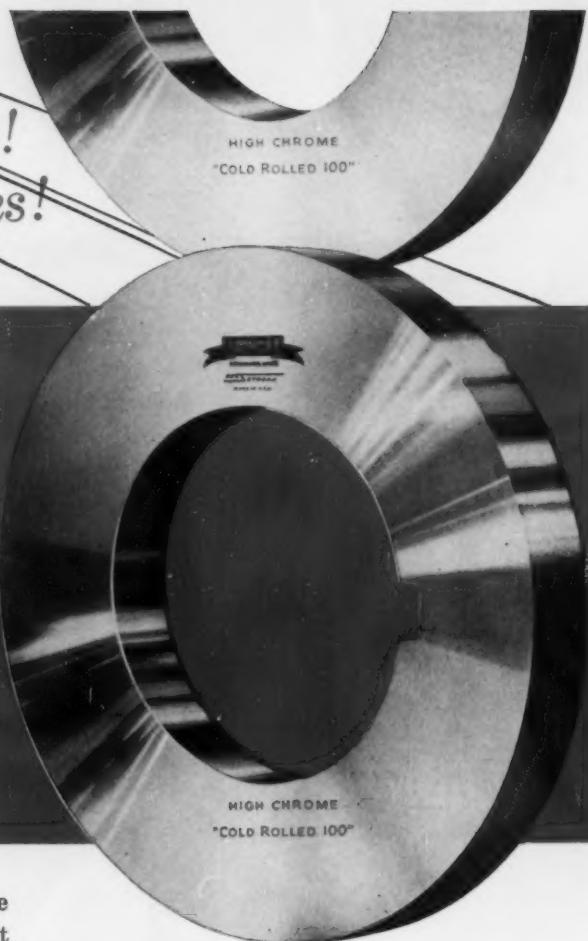
"He can throw you off balance with his knowledge of your specialty," says one J&L man. This is no uncanny knack. It is the result of 35 years of hard work. At 15 he joined J&L in St. Louis as a clerk, and attended night school for several years. After his transfer to Pittsburgh in 1926, he would leave

the office there at 5 p.m., three days a week, and work in the Aliquippa mill until midnight. This went on for three years. Eventually, he began moving up.

A firm believer in company morale building, he is enthusiastic about a program that brings field men into the home office as a means of strengthening company ties. He pays particular attention to developing sales personnel and advocates that new industries with growth possibilities be given special consideration.

His work with railroads in shipping steel got him digging into railroading with characteristic drive. Today he keeps authentic railroad models, can talk knowledgeably on the subject with professional engineers. But willingly his hobbies are neglected for the real work at hand—obtaining for J&L its share of an expected 33 pct increase in steel demand during the next decade. As John Timberlake's wife will tell you, "He gets a bigger bang out of work than anyone I know."

*Lapped Surfaces!*  
*Precision Grinding!*  
*Keener Cutting Edges!*



**SIMONDS**  
**RED STREAK**  
**Forged**  
**ROTARY**  
**SHEAR**  
**KNIVES**

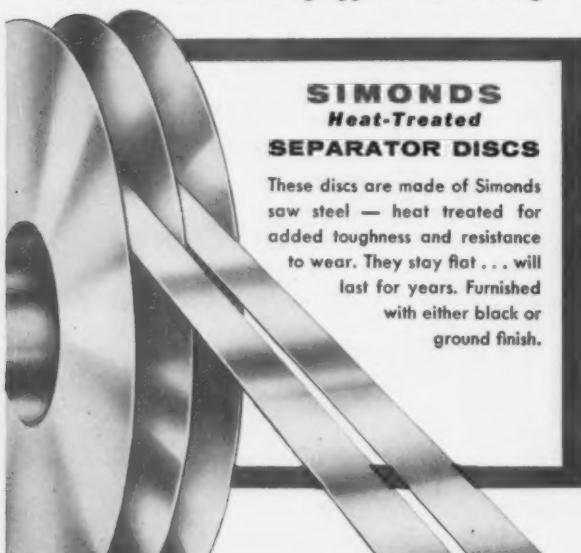
Because you need clean, accurate slitting, we couldn't be fussier about the steel, the heat treating, the grinding and the accuracy of our Red Streak Shear Knives . . . and you get the cleanest, most accurate slitting around!

To begin with, we furnish the *right* Simonds Steel for each shearing application . . . High

Chrome, Special Alloy or High Speed . . . forge it for added density and resistance to chipping and then precision grind for the utmost accuracy in operation.

On-the-job results prove the advantages of Simonds high grade tooling, both knives and spacing collars . . . advantages that mean savings in sharpening and replacement costs as well as in cleaner, more accurate slitting.

For the knives you need for your operations send today for the free "Shear Selector Chart" to help you cut costs as well as metal.



Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon  
 Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y., Heller Tool Co., Newcomerstown, Ohio  
 Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

## PERSONNEL



FOSTER H. PETTAY, elected president, The Ohio Crankshaft Co.

## The Iron Age INTRODUCES

**Raymond M. Waggoner**, elected vice president and general manager, Pacific Coast operations, **Hubbard and Co.**, Oakland, Calif.

**Glenn K. Thompson**, appointed superintendent, Middletown Fabricating plant, **Armco Drainage & Metal Products, Inc.**

**James C. McCloskey**, named plant superintendent, Gainesville, Tex. plant, **The National Supply Co.**, Pittsburgh.

**James B. Wilkie**, named manager, Gage Div., **Pratt & Whitney Co., Inc.**, West Hartford, Conn.

**Eric B. Insley**, named manager, Materials Handling Div., Los Angeles sales and service branch, **The Yale & Towne Manufacturing Co.**, Philadelphia; **James N. McEntee**, named sales manager.

**W. S. Sherk**, named technical director, operations, **Electro Metallurgical Co.**, Niagara Falls, N. Y.

**Robert W. Chapin**, elected president and chief executive officer, **Upper Merion & Plymouth Railroad Co.**, subsidiary of Alan Wood Steel Co., Conshohocken, Pa.

**Robert M. Hatfield**, named general sales manager, **Combustion Engineering, Inc.**, New York; **Frank M. Bader**, named manager, Western Div., Los Angeles.

**R. F. Myers**, appointed sales manager, Machinery Manufacturing Div., **The Motch & Merryweather Machinery Co.**, Cleveland; **Ray G. Knapp, Jr.**, named assistant to sales manager; **C. H. Priefer**, named district sales manager, four branch offices; **David S. Baus**, named district manager, Eastern seaboard, New York, and Eastern Pennsylvania.

**J. C. Moroso**, named asst. to general sales manager, **Electro Metallurgical Co.**, Div. of Union Carbide and Carbon Corp., Niagara Falls, N. Y.

**R. H. Breeback**, appointed manager, technical services, Sales Dept., Machinery Div., **Crown Cork & Seal Co., Inc.**

**Following appointments** are within the Detroit Transmission Div. of **General Motors**. **Walter B. Herndon**, appointed director, sales and engineering; **Philip E. Cartwright**, named director, quality control; **Robert F. Perry**, named director, work standards, methods and plant layout; **Robert W. Stapleton**, appointed asst. chief engineer, current design; **Thomas E. Dolan**, appointed experimental engineer.

**Bernard Kumko**, named Wyandotte chemical representative, Grand Rapids, Wyandotte Chemicals Corp., Wyandotte, Mich.; **John H. Sauntry**, named chemical representative, Chicago.



M. J. HOKE, elected senior vice president and general manager, The Ohio Crankshaft Co.



PAUL T. KOENIG, appointed secretary and treasurer, The Ohio Crankshaft Co.



A. KING McCORD, elected president, Westinghouse Air Brake Co.

# Large or small INDUSTRIAL CUT GEARS

- FURNISHED COMPLETE
- CUSTOM CUT FROM YOUR BLANKS
- HEAT-TREATED, CASE OR FLAME-HARDENED

SIMONDS GEAR produces a complete line of industrial cut gears in a full range of sizes from cast or forged steel, gray iron, bronze, Mechanite, raw-hide or bakelite. Also heat-treated, case or flame-hardened carbon or alloy steel. Or, you may have your own gear blanks custom cut to your order. Same quality... same prompt service. Send us your requirements for quotation.

ALSO stock carrying distributors of Ramsey Silent Chain Drives and Couplings; and industrial V-belts.



SPUR GEARS • BEVEL GEARS • MITRE GEARS  
WORMS • WORM GEARS  
RACKS  
PINIONS

**THE  
SIMONDS**  
GEAR & MFG. CO.  
LIBERTY at 25TH PITTSBURGH 22, PA.  
Quality Gears for over 60 years

## PERSONNEL

Lloyd A. Dixon, Jr., named West Coast sales manager, Houghton Laboratories, Inc., Olean, N. Y.

Albert C. Beer, named asst. technical director, Battelle Institute, Columbus, O.

Richard M. Ervin, named manager Washington, D. C. office, and district manager, East Central Industrial Truck Div., Hyster Co., Portland, Ore.

O. K. Warren, named buyer, Purchasing Dept., Laclede-Christy Co., Div. of H. K. Porter Co., Inc., St. Louis.

Following appointments are within the Technical Services Division of Jones & Laughlin Steel Corporation's Research and Development Department. Louis H. McQueen, named metallurgical contact engineer, sheet mill products, Detroit; Edson S. Bumps, appointed metallurgical contact engineer, sheet mill products, Pittsburgh; George J. Auner, named staff statistician, applied mathematics section, general office.

H. E. Ihrig, named manager, marketing personnel development, Detroit General Electric component.

James A. Carman, named director, materials and purchasing, Ball and Bearing Div., Hoover Ball and Bearing Co., Ann Arbor, Mich.

Richard M. Regan, appointed Eastern traffic manager, Minnesota Mining & Manufacturing Co.

Lynn B. Hirshorn, named manager, reinforcing bars and construction specialties sales, Bethlehem Steel Co., Bethlehem, Pa.

Paul L. Wharton Jr., named asst. general manager, Martins Ferry factory, Wheeling Steel Corp., Martins Ferry, O.



ROBERT O. WILDER, elected executive vice president, National Forge and Ordnance Co., Warren, Pa.



E. K. WALDSCHMIDT, named asst. sales manager, Bar Sales Div., Republic Steel Corp.



R. C. COLBAUGH, appointed asst. vice president, industrial engineering, U. S. Steel Corp.

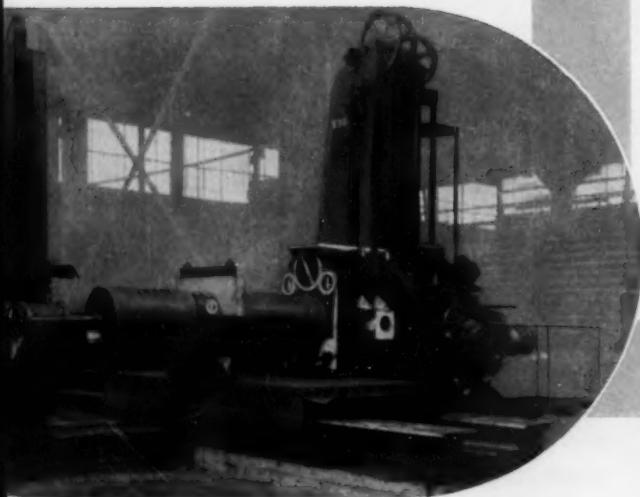
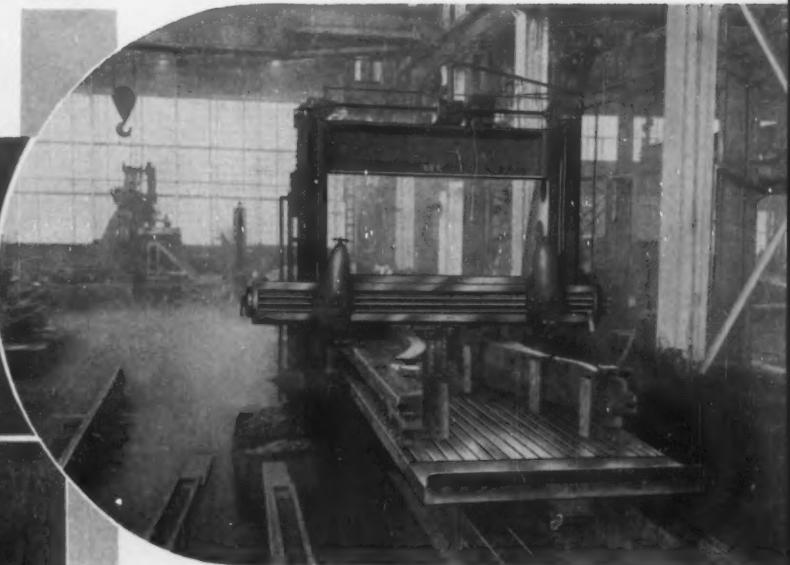
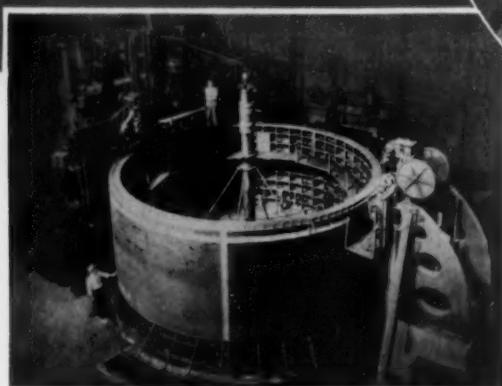


KARL L. LANDGREBE, JR., elected vice president, foundry operations, The Wheland Co., Chattanooga, Tenn.

# TREADWELL

*Do you need assistance  
in*

**REMACHINING  
OR  
REBUILDING?**



We would welcome your inquiries for rebuilding of machinery, job machine work, manufacturing of weldments and/or machining and similar operations.

We are not limited to rail shipments only. Large, heavy equipment can be moved into and out of the plant by barge if necessary.

We have available at our plant in Midland, equipment in the following ranges:

BORING MILLS	----- up to 32' swing
PLANERS	----- up to 14' x 12' x 42' stroke
LATHES	----- up to 72"
RADIAL DRILLS	----- up to 10'
PLANER MILLERS	----- up to 18" x 72"
VERTICAL MILLERS	----- up to 12" x 78"
UNIVERSAL MILLERS	----- up to 15" x 70"
SHAPERS	----- up to 5"
HORIZONTAL BORING MILLS	----- up to 7"
TURRET LATHES	----- up to 6 position
SLOTTERS	----- up to 48"
GEAR CUTTERS	----- up to 72" (Spur)

supplemented by non-destructive test equipment and stress relieving furnace of the following size; 17'11" x 17'2" x 60' inside.

**TREADWELL**  
**CONSTRUCTION COMPANY**  
PLANT AND MAIN OFFICE - MIDLAND, PA. (BOX 20)

PITTSBURGH NEW YORK CHICAGO



## **Maytag switches to STANICOOOL HD Soluble Oil... makes two-way saving**

- 1 Cost of soluble oil reduced**
- 2 Soluble oil consumption cut two-thirds**

A 300 ton Verson press at the Maytag plant, Newton, Iowa, is used for piercing holes in the inner tubs of Maytag's fine automatic washers. Material used is 18 gauge enameling iron. Holes are pierced in six automatic cycles. A total of  $936 - \frac{3}{16}$  inch holes and  $6 - 1\frac{1}{32}$  inch holes are incised in each tub.

A check of manufacturing costs on the tubs disclosed that the cost of soluble oil per unit produced was too high. Standard Oil lubrication specialist J. I. Nelson, working with plant management, suggested a switch to STANICOOOL HD Soluble Oil. The switch was made and Maytag received the first part of its two-way saving: the cost of soluble oil per

gallon was reduced. Then it was found that the same high quality product could be turned out, without loss of tool life, while spraying only every third tub. Formerly each tub was sprayed with soluble oil before punching. With STANICOOOL HD, Soluble Oil consumption was reduced two-thirds. And thus, Maytag received part two of its two-way saving.

**Perhaps STANICOOOL HD Soluble Oil** can help you make similar savings. Find out more about this quality soluble oil. Call your nearby Standard Oil office. There is one near you in any of the Midwest or Rocky Mountain states. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.

**Maytag, leader in cutting laundry time for modern homemakers, knows how to cut manufacturing costs, uses STANICOO HD.**



Dwight Norton (right), a Maytag plant foreman, inspects automatic washer inner tub with Jesse I. Nelson, Standard Oil lubrication specialist. Jesse Nelson is well qualified to provide lubrication technical service. He has a B. S. degree in engineering from the University of Iowa and has completed the Standard Oil Sales Engineering School. Jesse has been helping customers with lubrication problems for more than three years. Customers find his experience and training pay off for them.

#### Quick facts about STANICOO HD Soluble Oil

- Emulsifies readily with all waters.
- Forms stable, uniform emulsion.
- Does not turn rancid.
- Non-injurious to men, machines and work.
- Economical. Meets work requirements with relatively low emulsion concentrations.
- Prevents rusting of work and machines.
- Gives better tool life.
- Doesn't form gum on machines.



**STANDARD OIL COMPANY**  
(Indiana)

## PERSONNEL

Richard C. Lawton, named New England representative, Bearing Div., McGill Manufacturing Co., Inc., Valparaiso, Ind.

Frank H. Madigan, appointed district sales engineer, Grinding Machine Div., New York, Norton Co., Worcester, Mass.

William R. Fiand, sales and service, Electro Metallurgical Co., Pittsburgh office.

Allen Carlson, appointed territorial manager, Standard Products Div., Stephens-Adamson Mfg. Co., Aurora, Ill.

T. E. Rodgers, named works manager, Seneca Falls Machine Co., Seneca Falls, N. Y.; V. L. Percy, named chief engineer.

Bernard Seligman, appointed technical sales representative, Baker & Co., Inc., Newark, N. J.

Edward S. Coe, Jr., appointed general manager, Consolidated Machine Tool Div., Farrel-Birmingham Co., Inc., Rochester, N. Y.

Theodore Bolton, named manager, Cleveland, Chicago Wheel and Manufacturing Co., Chicago.

J. M. Cosgrove, named New York district manager, National Electric Products Corp., Pittsburgh; G. R. Ericson, named asst. district manager.

Paul J. Chaney, named commercial products sales manager, Metals Processing Div., Curtiss-Wright Corp., Buffalo, N. Y.

Paul R. Warren, named general sales manager, Fyr-Fyter Div., Fyr-Fyter Co., Dayton, O.

Richard O. Straight, named manufacturing manager, Cargill Detroit Corp., Birmingham, Mich.; William H. Ducker, named sales manager; William M. Peterson, named asst. manufacturing manager.

M. Cleighton Hilbert, named general manager, Coffing Hoist Div., Duff-Norton Co., Danville, Ill.

Ray E. Kranz, named sales engineer, Pittsburgh sales office, Steel Mill Div., Surface Combustion Corp., Toledo.

A. J. Murphy, Jr., appointed administrator, supervisory training, Westinghouse Electric Corp., Pittsburgh.

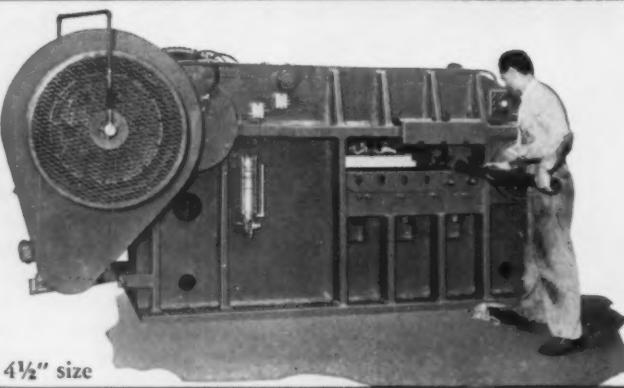
Burton O. Haun, Jr., appointed field sales manager, Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.

Joseph J. Ternes, appointed asst. to vice president, public relations and traffic, Kaiser Steel Corp., Oakland, Calif.

Albert W. McAbee, named acting manager, Railroad Sales Div., Inland Steel Co., Chicago.

# The Really NEW IDEA In Billet Shears . . . Now Proven In Service HILL ACME

GET THE FACTS—SEE THE EXPLANATION



4 1/2" size

- Simplicity of Design.  
Clean, square cuts.  
Low maintenance.
- You'll be amazed at its performance.  
You'll be surprised at the price.
- Made in 3", 4 1/2", 6 1/2" sizes and larger.  
Choice of hand, semi-automatic or  
fully automatic feed.

Full details and specifications are given in Bulletin SP-56.

**HILL ACME COMPANY**  
1209 WEST 65th STREET • • • CLEVELAND 2, OHIO  
"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING • THREADING  
TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES

**dag****'dag' dispersions... a touch does so much!**

After mold is machined, undiluted 'Prodag' is rubbed on the inside with a cloth.



Slick, non-porous surface of casting permits clean parting from mold and requires less finishing time.



## "Mold treatment with 'Prodag' for better products at low cost."

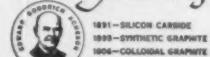
says Wisconsin Centrifugal Foundry

Wisconsin Centrifugal Foundry casts sleeve-type brass bearings in graphite molds. Castings range from 2 inches to 30 inches in diameter; pouring temperatures from 2,000 to 2,200°F. This company has found that a single application of undiluted 'Prodag', rubbed into the mold, lasts for entire production runs of certain items. Molten metal does not adhere to the inside surface, so castings part easily. Less time is required for finishing, so rejects are fewer. 'Prodag' helps Wisconsin Centrifugal turn out a better product at a lower cost.

'Prodag' and other Acheson dispersions have become indispensable for many foundry applications because of their remarkable properties under the most severe conditions. Acheson Service Engineers will be glad to give you specific information on the use of 'dag' dispersions for mold coatings, maintenance lubrication, and other applications. No obligation, of course.

For ready-to-use materials containing 'dag' dispersions see your own oil supplier, or write directly to us.

*100th Anniversary*



1891—SILICON CARBIDE  
1900—SYNTHETIC GRAPHITE  
1906—COLLOIDAL GRAPHITE



**ACHESON  
COLLOIDS  
COMPANY**

PORT HURON, MICHIGAN

... also Acheson Colloids Ltd., London, England

**ACHESON COLLOIDAL DISPERSIONS:**  
Graphite • Molybdenum Disulfide • Zinc Oxide  
Mica and other solids

'dag' and 'Prodag' are registered trademarks of Acheson Industries, Inc.

Offices in: Boston • Chicago • Cleveland • Dayton  
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New York • Pittsburgh • Rochester • St. Louis • Toronto

**Acheson Colloids Company  
Port Huron, Michigan, Dept. D-9**

Yes, I want your free bulletin describing  
'dag' Dispersion for Metalworking.

Name \_\_\_\_\_

Title \_\_\_\_\_

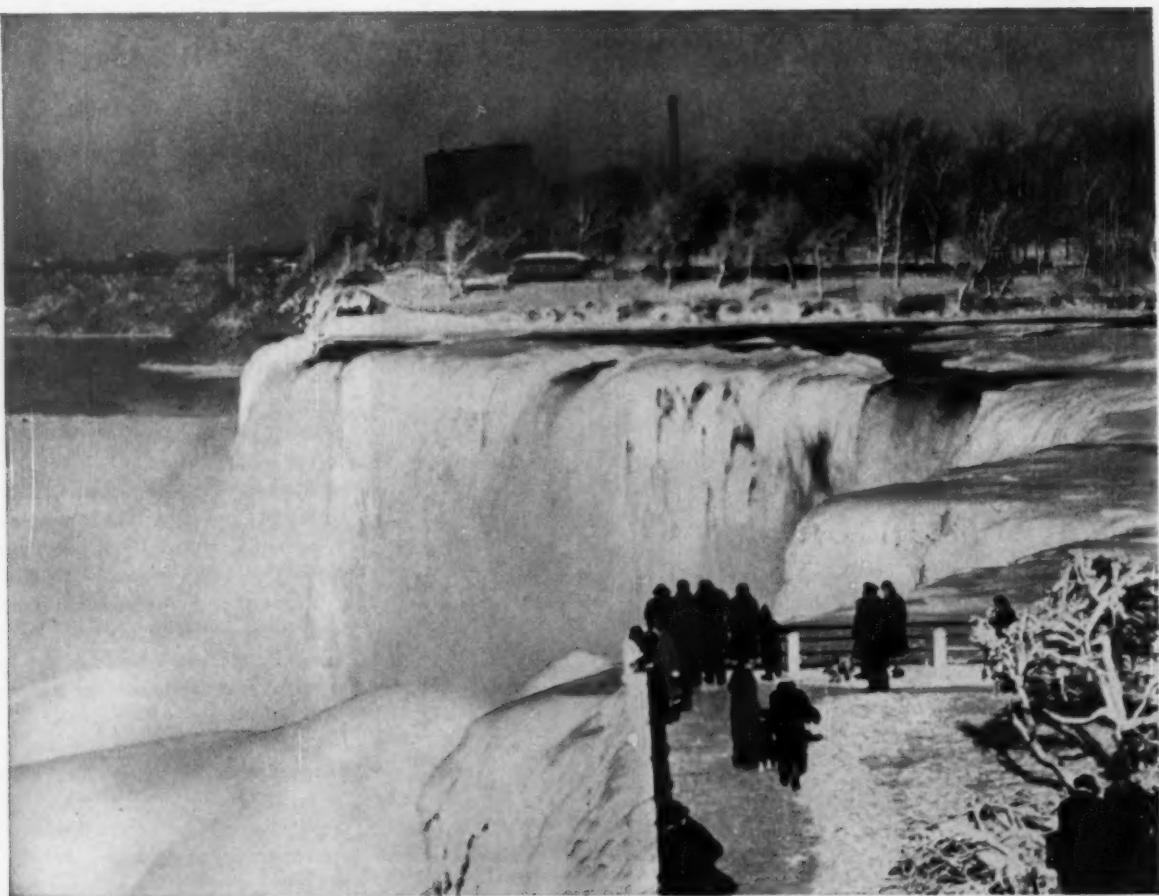
Company \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

# ANTISEP

the all-purpose water-soluble cutting base



Water is the fastest, cheapest coolant in the world

**ANTISEP makes water work wonders for you!**

In machining, water will carry heat away from tools and work much faster than any straight cutting oil. But water lacks other needed properties. That's where ANTISEP works its magic.

As little as 3% of this fortified all-purpose base added to water produces the finest cutting fluid money can buy. It combines high film strength with extra lubricity and anti-welding properties. Its anti-septic qualities protect workers and eliminate ob-

noxious odors from the shop. At an end cost of 8c per gallon in the machine, ANTISEP gives you longer tool life, higher quality work, and stepped-up production.

Ask to see the proof of ANTISEP's performance in metalworking plants—the Houghton Man has plenty to show you. A test can be arranged at your convenience. Just write to E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa.

**ANTISEP** all-purpose cutting base

... a product of

**E. F. HOUGHTON & CO.**  
PHILADELPHIA • CHICAGO • DETROIT • SAN FRANCISCO



Ready to give you  
on-the-job service ...

## CHICAGO CONCRETE ON THE JOB IN HOURS



# Saved

### 40 HOURS OF PRODUCTION

"WE THOUGHT OUR FURNACE WOULD BE OUT OF PRODUCTION AT LEAST 2 DAYS . . . BUT WITHIN TWO HOURS AFTER THE BREAK-OUT CHICAGO CONCRETE WAS ON THE JOB . . . AND IN 24 HOURS WE WERE BACK IN FULL PRODUCTION," so commented the superintendent of blast furnaces at a well-known steel mill. It is another story typical of the speed that CHICAGO CONCRETE is capable of — speed that has saved customers thousands of dollars. This is the story:

At 11 P.M. we received an emergency call . . . a break-out of iron on the hot metal tracks had burned up the tracks and welded a number of railroad trucks to them. By 1 A.M. the first CHICAGO CONCRETE men were on the job. In 8 hours they had the spill cleaned up and new tracks laid. Four sets of railroad trucks were saved from the scrap-heap by the careful use of dynamite . . . a service that CHICAGO CONCRETE are experts at.

On the job faster . . . with experienced skilled personnel . . . employing the most modern equipment . . . that is CHICAGO CONCRETE'S story. You, too, can depend on CHICAGO CONCRETE in any emergency.

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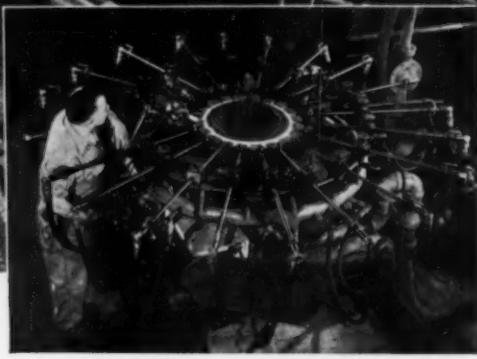
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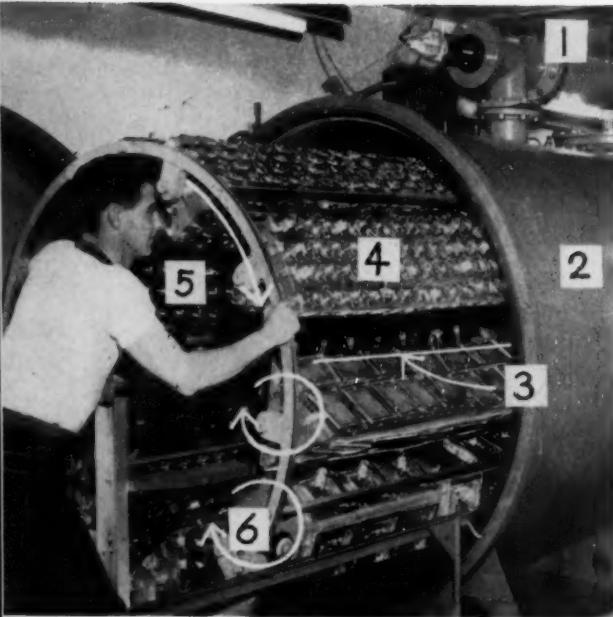
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VACUUM pump (1) draws pressure down to micron level in tank (2). Hot electrode source (3) evaporates metal, which migrates to cooler work-pieces (4) rotating in jig (5) and holders (6).

FEATURE  
ARTICLES

As specialty coating—

# Vacuum Metallizers Reach New Markets

- ♦ Vacuum metallizing has traveled a long way since its early days . . . Formerly classed with the decorative finishes, it's now discovered what may be an even brighter future as a specialty coating . . . In this new role, it has solved some tough coating problems, and can cope with many more.
- ♦ With precisely controlled film thickness, the low-cost coating adheres well to metals and nonmetals alike . . . A host of other favorable properties can make it a preferred choice at times over electroplating, chemical and organic coatings.

By P. J. CLOUGH,  
and J. H. DURANT,  
National Research Corp.,  
Cambridge, Mass.

♦ TALK of vacuum metallized finishes usually receives mixed reactions. Their low cost has never been seriously disputed. But in the minds of many, they were earmarked for such inexpensive goods as costume jewelry, toys and novelties. Recent progress with the process refutes this thinking.

Consider these advantages, each helping to push vacuum metallizing into broader use: (1) low cost per part, (2) light film weight, (3) conserves scarce or expensive materials, (4) adheres well to metals and nonmetals alike, frequently with a molecular bond, (5) conforms closely to even sharply changing contours, (6) film thickness readily and precisely controllable, (7) deposits as a pure, gas-free film, (8) avoids need for corrosive cleaning baths, (9) no buffing or polishing required, most often.

Most, if not all, vacuum-deposited films share these favorable characteristics.

In addition, depending on design specifications and the material deposited, the film can be: (1) electrically conductive, or insulating, (2) highly



TYPICAL of more recent applications are rear-surface metallized medallions, nameplates.

reflective, or glare reducing, (3) scratch resistant, or relatively soft, (4) solderable, or non-wetting, (5) transparent, translucent or solidly colored through a spectrum of hues, tones and sheens; metallic or nonmetallic. More thorough exploration of the vacuum metallizing field should reveal still other benefits.

As far as definitions go, vacuum metallizing falls into the broader classification of vacuum thermal evaporation. The latter term describes the process more appropriately, since both metals, and nonmetals can be deposited.

Aluminum has found general favor among the metals deposited. But practically every known metal and some alloys may be evaporated. Nonmetals usually are deposited as metallic salts.

#### Builds up on most materials

Both metals and nonmetals build up, molecule by molecule, on virtually any material, metallics and nonmetallics, the latter including plastics, glass, paper, wood, cloth, lacquered or enameled surfaces, as well as a host of others. The film deposits at room temperature, so the process is not limited to heat-resistant substrates.

But low cost per vacuum metallized part usually can be demonstrated with ease. At times, this has been the only immediate justification for use of metallizing as a finish. Even now, the cost factor still may dominate comparisons of this and other finishing processes.

More frequently than ever before, vacuum

metallizing is being specified not for reasons of economy, but because it satisfies design and service requirements far beyond those expected of a decorative finish. Sometimes, it's reported, desired product performance can be achieved in no other way.

A thin, uniform film controllable within very close limits characterizes the vacuum metallizing process. The optical industry soon recognized this.

On camera and binocular lenses, the non-glare coating of vacuum-deposited magnesium fluoride is one-quarter wave length thick. In precisely contoured mirrors, the process offers a way to adjust the configurations of curved surfaces: by accurately varying the coating thickness. Interference filters and graded density sunglasses are metallized in the same manner for slightly different reasons.

Ability to precisely control thickness of vacuum metallized films enhances its utility also in the manufacture of some electrical components. Electrical conductance in precision resistors, for example, varies in direct relation to thickness of the metal film employed. This film must consequently be held to tolerances within narrow limits. The controlled thickness possible through metallizing enabled development of precision resistors with zero thermal coefficient of electrical resistivity.

Light weight and efficient use of deposited material make metallized films a natural design



**BELL JAR** setup handles precision production metallizing of electronic and optical parts.

device for miniaturization. Compactness of some modern electrical parts, including capacitors, resistors and printed circuits, depends principally on use of electrically conductive, but very thin metallized films.

Throwing power in electroplating solutions largely determines uniformity of the deposited coating. The term may not be strictly applicable to vacuum metallizing. But if allowed for clarity, "throwing power" of the evaporating source can be excellent.

This occurs because the migrating molecules of metal meet little resistance in traveling through vacuum from hot electrode to cooler workpiece. In well designed installations, the result can be a uniform metallic film closely conforming to all workpiece surfaces. This holds

true even if complex contours are involved. Vacuum-deposited copper or gold films faithfully follow the most subtle configurations in grooves of wax phonograph record masters.

This same combination of properties also makes possible selective area coverage through masking techniques. Masks applied before metallizing by photographic, silk screen or block printing techniques strip off later to reveal the desired coating pattern on the basis material.

#### Improve scratch resistance

In improving film resistance to abrasion, scratches, corrosion and tarnish, vacuum metallizers have made great strides. Transparent, hard films of titanium oxide or silicon monoxide protect softer coatings or basis materials, and help improve scratch resistance. Metallized films used in conjunction with appropriate organic top-coats have outperformed copper-chrome electroplated finishes in some laboratory abrasion tests.

This last does not necessarily imply superiority of metallized films over plated coatings, for abrasion performance of the former still depends on its organic topcoat. However, the finish can be superior in other respects to copper-chrome electroplated finishes on steel. In ability to withstand corrosion, for example, metallized parts have successfully passed 500-hour salt spray tests.

Adhesion of metallized films is excellent on clean basis materials. Vacuum thermal evaporation generates individual molecules which travel with high energy toward cooler workpiece surfaces to be coated. A molecular bond results on sufficiently clean surfaces.

This last property has encouraged a wide variety of applications. Glass can thus be soldered to metal cases where a hermetic seal is required. Difficult-to-join materials may be rendered solderable.

The process deposits substances in their unadulterated state. Metal evaporates and actually distills to purity as it transfers from the hot electrode source to the cooler workpiece.

No corrosive washes, reagents, rinses or surface activation agents are involved. This prom-

### Characteristics of Vacuum Deposited Films

**Low cost**  
**Low weight**  
**Firmly bonded**  
**Pure**  
**Gas free**  
**Contour clinging**  
**Corrosion free**

**Abrasion resistant**  
**Scratch resistant**  
**Non-glare**  
**Highly reflective**  
**Metallic**  
**Nonmetallic**  
**Electrically conductive**

**Insulating**  
**Transparent**  
**Translucent**  
**Variously colored**  
**Solderable**  
**Nonwetting**  
**Of controlled thickness**

**"... Mirror-bright finishes  
serve both decorative,  
functional purposes."**

ises complete absence of corrosive residues after metallizing. Corrosive action caused by residues from some electroplating operations can be troublesome on complex shapes, or parts which must have long shelf life.

Vacuum thermal evaporation deposits a gas-free film. This trait makes metallizing a preferred method when coating parts later assembled inside electron tubes. In exhausting the tubes, no gas evolution occurs to lengthen the pumping cycle.

The process also offers a means of depositing corrosion-resistant films on metal parts where the possibility of hydrogen embrittlement rules out other coating methods. Electroplating, dissociation and reduction coating methods often require or evolve hydrogen.

High reflectance is a frequently sought property of metallized finishes. Mass-produced, low-cost aluminum reflectors return more than 90 pct of incident light, a higher proportion than possible of commercially chrome-plated or polished metals. Under carefully controlled conditions, it's possible to attain 98 pct reflectance.

Metallizing produces not only mirror-bright decorative finishes, but also functional reflectors. Integral reflector bulbs, sealed beam headlamps, television picture tubes, and recently designed fluorescent tubes—all use reflectors aluminized by vacuum thermal evaporation. Mirror scales on instruments also use reflective films in conjunction with masks, the latter usually applied by photographic means.

**Films reduce glare**

Nonreflecting films serve to reduce glare from surfaces, typically those of highly polished optical elements. They also produce the so-called "invisible" windows. Evaporated films of such nonmetals as magnesium fluoride supply the desired glare-free surfaces. In camera lenses, for example, the transparent coating not only encourages better light transmission, but also more faithful color reproduction.

The process can impart a metallic luster difficult to distinguish from polished or plated metal. Properly finished vacuum metallized aluminum, for example, closely simulates the appearance of an astonishing variety of other metals. This list includes gold, copper, brass, bronze, platinum, silver and chromium. The vacuum metallizer applies a clear or tinted lacquer or enamel topcoat to achieve this effect. Low in cost, it's been noted to increase the sales appeal of many products.

The film may be vacuum metallized either on the front or rear surface of transparent mate-

rials. In rear surface metallizing, clear acrylic or polystyrene plastic is first molded to emboss a desired pattern. Then the coating is metallized on the rear surface, usually in conjunction with colored paints.

Rear-surface coated parts ordinarily cost more than those metallized on the front. The technique calls for relatively expensive materials. Then too, application of complex designs can require several operations. But the end result frequently more than justifies its cost. The decorative medallions found on automotive horn buttons, refrigerators and large appliances, jewelry and cigarette boxes, typify some of the results possible.

Equipment requirements for vacuum metallizing vary with the product design, material to be deposited and desired production rate. Integral reflector bulbs and television picture tubes provide their own vacuum chambers: after mounting on special rotary or in-line machines, tubes are evacuated, then metallized on interior surfaces. Oversized bell jar type equipment handles precision optical elements.

**Typical metallizing set up**

Plastic and metal parts normally metallize in large, horizontal vacuum tanks of substantially standard design. A typical system consists of a 5½-ft diam steel tank equipped with a high temperature evaporating source situated along the central axis.

Small parts to be coated fit in clips or picks arranged radially in rows along a series of rods. Appropriately sized clamps hold larger parts to the rods. Each rod spins on its own axis, while revolving at the same time around the evaporating source.

A high capacity pumping system evacuates the chamber to an operating pressure of less than one-millionth atmosphere. The system can comprise several diffusion pumps plus a large, mechanical roughing pump. Evacuation times of 4 to 8 minutes with total cycle times of 7 to 10 minutes are not unusual in well managed plants with modern equipment.

The applications mentioned heretofore involve batch processing of individual parts, as opposed to continuous vacuum metallizing. Properly designed equipment can continuously coat rolls of plastic, paper or textiles. Such materials later find use in heat reflective safety clothing, electrically conductive films for radar reflection, electrostatic shielding, and for decoration.

Low cost of the process, in addition to the many particular advantages outlined previously, warrants its consideration for numerous special service applications.

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■ Reprints of this article are available as long as the supply lasts. You may obtain a copy from READER SERVICE DEPT., *The Iron Age*, Chestnut & 56th Sts., Philadelphia 39, Pa.

◆ DUBBED THE INCHWORM, a new ultra-precise electronic feed control for machine tools permits dimensional accuracies in the micro-inch (0.000005 to 0.0001 in.) range. For machine shops requiring precision fits of assembled parts, it can reduce the need for selective mating of parts to compensate for machining inaccuracies.

It opens the way, too, for automatic assembly of many such precision parts.

Airborne Instruments Laboratory Inc., of Mineola, L. I., N. Y., developed the linear actuator. First large-scale machine tool application is on centerless grinders, used for turning out precisely finished hydraulic parts.

Remarkably close control is obtained. On Cincinnati Milling Machine's flat bed No. 2, for instance, where the actuators substitute for lead screws, they consistently give accuracy of  $\pm 0.000005$  in. This is done under machine loading conditions requiring a breakloose force (work-holding system from ways) of 300 lb, and a sliding force of 220 lb.

#### Needed closer tolerances

Need for the device stemmed from the very tightness of the tolerances it helps to hold. Increasing tightness of work specs required machine tools with cutting surfaces which could be positioned accurately with respect to the work-holding system. The result was more and more massive machine tools, to prevent vibration and to make a very rigid system.

But there was an inherent drawback. Generally, cutting tools mount on a heavy member which slides on accurate ways formed as part of the machine bed. A phenomenon known as

Grinding precision parts?—

# Tighten Tolerances Tenfold With Microinch Feed Control

slipstick exists which requires a larger force to start two members sliding with respect to one another than is required to maintain a slow, steady-state velocity between them.

This phenomenon had to be overcome or reduced before positioning in the millionths-of-an-inch range could be accomplished.

The actuator does overcome it. The device reduces the minimum increment of slide motion in typical installations by a factor of 15.

Functioning of the highly unconventional device is literally described by its name, inchworm. It moves along in microinch steps, expanding and contracting like its familiar green namesake. This is accomplished through the magnetostrictive effect. This causes the armature of the motor to shrink under the influence of an electromagnetic field, and to snap back to original size when the magnetic field de-energizes.

A pair of clamps, cooperating with the armature, convert the expansion and contraction undulations into forward or backward motion, reversing on demand without backlash. Result is a controlled increment of relative motion between the moving parts thus regulated.

With a simple converter, Inchworm-fitted machines will respond directly to gage signals; thus to tool, material hardness, other variations entering into precise machine finishing.



ACTUATOR-FITTED centerless grinder finishes piston pins to microinch dimensions, in pilot operations at Airborne's Long Island plant.

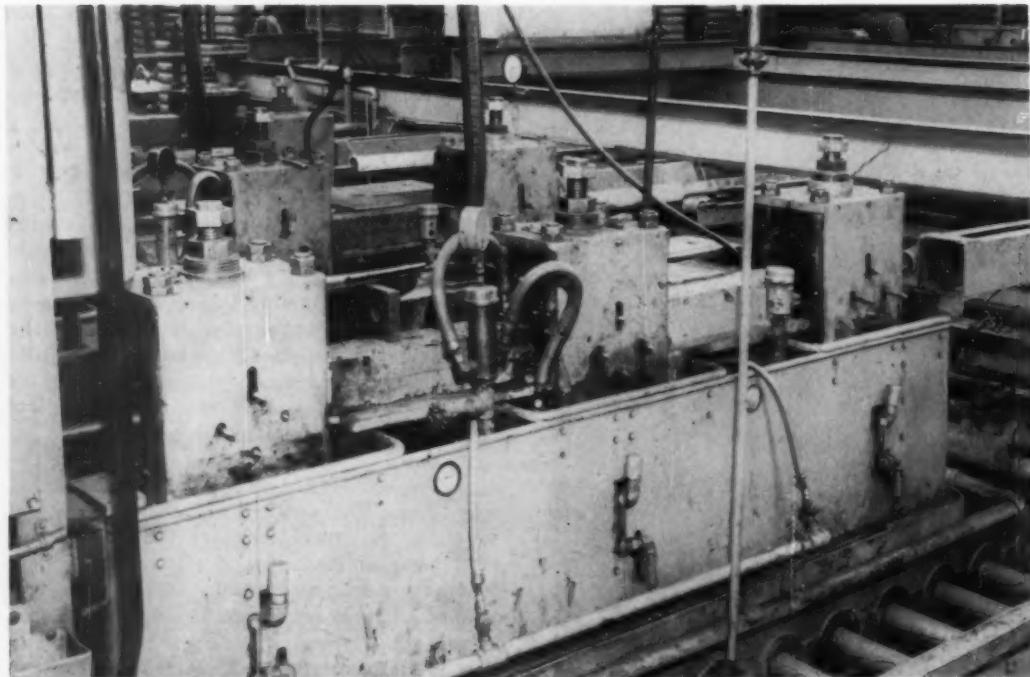
Harden 50 pct faster—

# Dual Frequencies Put New Life In Heat Treating Line

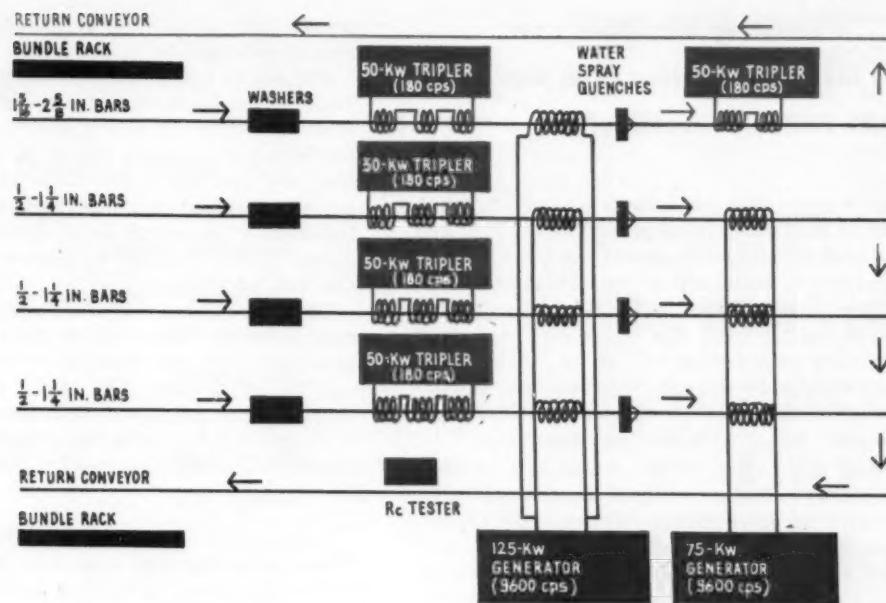
♦ In induction heat treating, the right frequency at the right power works best . . . This can mean costly equipment modification to handle variously sized workpieces . . . But there's another way—dual frequency.

♦ Using 180 cps coils to preheat, 9600 cps coils to harden, this firm jacked up hourly production 50 pct without increasing layout size . . . Two part sizes now process at once, where one ran earlier . . . Equipment capacity is up too.

By W. H. LENZ, Heat Treat Engineer, Caterpillar Tractor Co., Peoria, Ill.



BAR STOCK heat treats 50 pct faster, moves through preheat, hardening and tempering coils.



**HARDENING** line now handles two part sizes at once. Note equipment added (color overlay).

♦ **DUAL** frequency operation can charge your induction heating setup with new life. Planned properly, line production rate can jump without excessively high investment in new heating equipment.

In addition to higher production speeds, benefits may include: (1) lower inventory requirements, (2) higher, more uniform product quality, (3) fewer production bottlenecking incidents at heating stations, (4) the possibility of running variously sized bars at the same time—without downtime for altering induction machine settings or coils.

Caterpillar Tractor Co., Peoria, Ill., brought about all these benefits by relatively low-cost conversion to induction heating at two frequencies: 9600 cps and 180 cps. The previous installation progressively hardened and tempered bar stock at one frequency only: 9600 cps.

The revamped 4-line induction heating setup differs from the earlier one in several important respects.

First, production rate now is 50 pct higher than the 750 running feet of bar stock formerly processed every hour. This was accomplished without increasing square footage of the installation's layout. Just as important, heat treated bars pass inspection with the same high quality as before.

Second, equipment now handles bar stock  $\frac{1}{2}$  in. to  $2\frac{5}{8}$  in. diam, 22 ft long. Previous limit was  $\frac{1}{2}$  in. to  $1\frac{1}{4}$  in. diam. Length is restricted only by handling equipment and factory space available.

Third, two bar sizes now progressively harden and temper at the same time. One line processes

stock  $1\frac{5}{16}$  in. to  $2\frac{5}{8}$  in. diam. The remaining three heat treat sizes between  $\frac{1}{2}$  and  $1\frac{1}{4}$  in. diam.

Fourth, additional heating capacity works at 85 pct efficiency, even at 60 pct of rated load. This means less cost per kilowatt-hour of electricity consumed.

The 180-cycle coils function mainly to preheat the bar stock. This cuts time for heating into the temperature range producing the desired hardness on quenching.

Induction energy at 9600 cps heats bar stock up to 1 in. diam better than 180 cps power. More accurately, Btu input induced into the steel is greater in small diameter bars than large, assuming standard conditions and a given energy input to the heating coil. Conversely, energy at 180 cycles works more efficiently in bars over 1 in. diam.

#### Heats larger bars

This comparison of efficiency holds true only for the range of temperature that is practical to attain with 180 cps energy applied to a bar of specific diameter. It's recognized that 180-cycle current will heat metal of any thickness somewhat. Specifically, 180 cps energy will preheat  $\frac{1}{2}$ -in. diam stock to about  $1000^{\circ}\text{F}$ . Same energy preheats  $1\frac{1}{4}$ -in. diam bars to about  $1300^{\circ}\text{F}$ . Stock over 2 in. diam will heat beyond the Curie point: in steel, above  $1400^{\circ}\text{F}$ .

The original high frequency induction heating setup hardened and tempered bar stock from  $\frac{1}{2}$  to  $1\frac{1}{4}$  in. diam. Its installation some years ago enabled specifying machinable carbon steel instead of alloy steel in parts formerly requiring

**". . . Boosting available energy increases heating rate, permits faster processing."**

the higher strength material. Availability of carbon steel, its physical properties and relatively low cost encouraged expanded use in many other designs originally calling for alloy steel.

The initial installation did its hardening and tempering job well. But increased usage made necessary enlargement of the line. After much consideration, this was done by purchase of additional induction equipment, then coordinating in the same layout with older equipment.

Both old and new layouts consist of four lines. Formerly, each line included a roller conveyor carrying bar stock successively through a washer, induction coils for hardening, quench spray, and coils for tempering. One 125-kw, 9600-cycle motor generator set powered the hardening coils through parallel circuits. A 75-kw, 9600-cycle motor generator set supplied power to the tempering coils in similar fashion. In addition, the installation included bar stock handling equipment, a cutoff wheel and a hardness tester.

Bundled bars to be hardened and tempered were lowered upon a rack in front of the equipment. After separating, the operator placed the bars individually in one of four V-roll conveyors leading through the line. Bars fed through a washing machine to remove oil. This step avoided deposit of carbon in the heating coils.

**Get high-pressure quench**

After leaving the washer, bars proceeded to the first induction coil. There the 9600-cycle current heated them to about 1700°F. Continuing, bars progressively passed under a high-pressure water spray quench. Continuously moving, they entered the second induction coil which tempered them at 1100° to 1300°F.

On clearing the drawing coil, bars struck a trip lever and dropped to a lateral conveyor. The crossover conveyor deposited them on the return rolls, which carried them back to the bundling rack. On the way, bars passed by an inspection station. A percentage of bars picked off the return conveyor there were sampled for hardness and physical properties.

On original equipment, only one size could run at a time. With sufficient inventory, this procedure sufficed. But trouble cropped up every time low inventories combined with shop requests for several sizes simultaneously. Then, additional setups necessary to meet the sporadic demand caused great delay in processing.

Increased capacity of the earlier setup has been achieved by converting to dual frequency and supplementing the energy supply. Boosting available energy increases the rate of heating. This

permits processing bars at a faster rate. Five sets of 180 cps coils do the job.

One set of triple coils for preheating sits in front of the hardening coil in each of the four lines. The fifth coil set—a double one—replaces the 9600 cps tempering coil in one of the lines—that now used for larger diameter stock. Each set of additional induction preheating coils is individually energized by a 50-kw static frequency tripler, supplied by General Engineering Co., Ltd. of Canada.

The four triplers for energizing preheat coils mount directly atop their respective coils. All integrate in the line between washing machines and hardening coils. The tripler powering the tempering coil fits above the crossover conveyor. Arranged in this manner, the setup improves bar capacity and production speed without increasing floor area.

**Large line is separate**

One processing line now runs independently of the other three. It hardens and tempers bars from 1 1/8 in. to 2 5/8 in. diam. A separate busbar connects this line to the point of voltage regulation. The circuitry permits processing stock 1/2 to 1 1/4 in. diam on the other three lines without disrupting operation of the larger station.

A double set of 180 cps coils replaces the 9600 cps induction coils for tempering larger diameter bars. The full 75 kw of the original tempering circuit then can feed to three rather than four lines. Increased power of the 9600 cps tempering circuit shortens time for heating into the drawing range. This allows a substantial increase in bar speed through tempering coils.

Formerly, 125 kw was available for induction hardening and 75 kw for tempering. Adding the triplers increased this to 325 kw for hardening and 125 kw for drawing.

Flow of bars through the modified equipment is substantially the same as before. It differs only in that bars pass through preheat coils after leaving washers, and before hardening.

Three reasons encouraged selection of static frequency triplers: (1) no need for additional floor area, (2) low capital investment, and (3) efficient operation.

Under 60 pct rated load, triplers convert 60-cycle, 3-phase current to 180-cycle, 1-phase current at 85 pct efficiency. This compares favorably with average efficiencies of motor-generator sets: from 60 to 90 pct at full rated load. Conversion efficiency of triplers does not drop as rapidly at less than rated capacity.

Even though production increased 50 pct, operators maintain the same high quality in heat treatment as earlier. Bars of 7/8 in. diam SAE 1035 carbon steel consistently induction harden through to the core at RC 48. Bars 1 1/4 in. diam of AISI Grade TS14B35 alloy through-harden before tempering to RC 48. Gradient hardness from surface to center, and from bar to bar, is controlled within  $\pm 3\frac{1}{2}$  RC by tempering.

## Checklist For Punch Press Care

- \*Adequacy of lubrication
- \*Condition of bearings
- \*Slide alignment
- \*Brake lining, adjustment
- \*Clutch bolt
- \*Bell crank
- \*Spring plunger
- \*Ball socket
- \*Air ejector
- \*Treadle

## Punch press checklist—

# Systematic Maintenance Cuts Stamping Costs

◆ PUNCH press accuracy is only partly the builder's responsibility. Assuming basically sound press design, it's up to the user to maintain the accuracy essential for long, low-cost production life. Preventive maintenance, carefully and systematically carried out, forms a major part of the program to achieve this.

Lack of an adequate preventive maintenance program can lead rapidly to excessive production costs. These can range from high press downtime for repairs, through short die life, to an abnormal stamping reject rate. In extreme cases, press misalignment can result in breakage of dies costing many times more than the press itself.

### Base lubrication on service

Checkpoints at each inspection include adequacy of press lubrication, slide alignment, condition of bearings, and a number of other items. Suggestions of Walsh Press & Die Co., Chicago, apply to most standard punch presses.

Punch presses generally should be lubricated every four hours of continuous operation. With single stroke operation, every eight working hours suffices. Follow the builder's recommendation on exact lubrication intervals, and location of lubrication points.

Next to adequacy of lubrication, perhaps the next most important item is press slide alignment. Do not permit clearance between slide face and bolster plate to exceed 0.002 in. This avoids excessive die wear and breakage.

Check bearings next. Main and upper connection bearings as well as gib bearings should

receive daily lubrication to assure long service.

Go on to brake linings. They should be cleaned or replaced if saturated with oil or grease. Check brake adjustment. If too loose, slide can return beyond the top of the stroke. Momentum can lead to breakage of the latch bracket. Tight brakes may overheat.

See that the ball socket assembly is properly lubricated. It should operate on a film of oil at all times.

Examine the clutch for free movement of clutch bolt and other activating parts. Clean off hardened grease and oil. If driving edge of the clutch bolt shows excessive wear, replace the part.

Check bellcrank for free action. Make sure it pivots easily on the crankshaft. Inspect also the spring plunger assembly. It must work smoothly with the bell crank to permit engaging and disengaging the clutch bolt rapidly. Check spring barrel for hardened grease, and occasionally inspect the spring itself for weak or broken coils.

Pneumatic ejectors should be examined for air leaks. Make sure air strainer is clean.

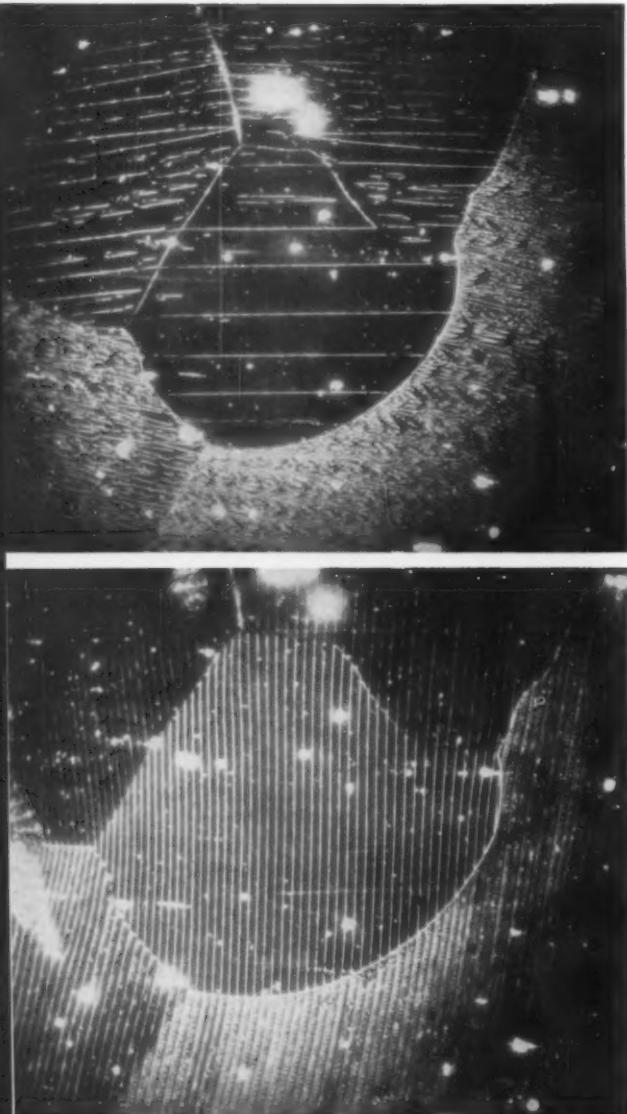
Springs, bolts, cotter pins and clamping screws of the treadle must be inspected for excessive wear. Treadle should operate freely without rubbing against the side of the press.

Replace striking pins on the flywheel occasionally. Worn pins may be detected by the clicking noise they cause during operation.

Adjust tension of V-belt drive if necessary. Check safety guards. If tierods are used, check for proper function.

Underlines trend—

# New Blading Alloy Improves Turbine Performance



- ♦ Turbine efficiency is linked to higher and higher operating temperatures . . . Blading materials that can't perform at better than 1000°F are fast becoming obsolete.
- ♦ A new alloy—specially designed for blading—has high strength, excellent damping capacity even at 1200°F . . . Its development highlights an important trend in metallurgical research.

By P. M. UNTERWEISER, Metallurgical Editor

♦ NIVCO is a new and distinctively different high temperature alloy. Admittedly, it does share some things in common with other high temperature alloys. It contains nickel, chromium, iron, and cobalt and was designed specifically for turbine blading. Any further resemblance to previous alloys is more likely to be coincidental.

Nivco's particular distinction—aside from inherent metallurgical and mechanical properties—stems from the fact that it *was* very carefully designed. It is not the result of fortuitous accident nor the end product of cook book formulation.

Developed at the research laboratories of Westinghouse Electric Corp., Pittsburgh, under the direction of Dr. Clarence Zener, Nivco is pretty much the personal brainchild of A. W. Cochardt. How he and his associates approached the initial metallurgical problems and came up with a workable answer in the form of a brand

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Crystal domain pattern of unmagnetized ferromagnetic material (Top) is without stress and shows random orientation. Under imposed stress (Bottom), note orientation of all domains.

new alloy is possibly as significant as the alloy itself. It is certainly indicative of the latest trend in metallurgical development.

Simply stated, the problem was to find a superior blading material for use in steam turbines. The 12 pct chromium steels in use since the 1920's were obviously incapable of meeting the rigorous operating requirements of the more advanced, and considerably more efficient, turbine designs. Turbine progress hinged almost entirely on finding this new and superior material.

To fill the bill, the most desirable blade material would have to have high strength at temperatures above 1000°F. But it would also need high damping qualities at these elevated temperatures. Automatically eliminated were many jet blading materials which have the hot strength but could not match the damping needs without mechanical assistance.

#### What factor effects damping?

What is it that endows an alloy with high damping capacity? The initial stages of the research program found the answer in an effect known as "magneto-mechanical hysteresis."

Essentially, this effect in ferromagnetic materials links the direction of an imposed stress with the magnetic orientation of ferromagnetic domains. Mechanical stress can, by itself, alter the direction of magnetization. When this change occurs, domain structure is altered, energy is dissipated, and damping is actually improved.

But *how much it is improved* depends predominantly upon the chemical and structural composition of the material.

Based on knowledge previously derived, it was apparent that some alloy containing nickel, iron, cobalt, and chromium and having a face-centered cubic structure would most likely fit the requirements. But there were still a number of other qualifications—all of them important. The optimum alloy had to be hardenable (for strength), ferromagnetic, possess a Curie temperature higher than 1200°F, and respond readily to irreversible magnetostriction.

These special restrictions narrowed the field still further. For the high Curie temperature requirement, choice was limited to those alloys whose compositions lie in the shaded areas of Fig. 1. All of this Curie temperature information, incidentally, was readily available in textbooks on ferromagnetism.

With Curie temperature needs settled, the next step was to choose an alloy with excellent hot strength. Analysis pointed to a base composition of about 65 pct cobalt and 35 pct nickel. In addition to hot strength, alloys in this range have about three times the damping capacity of the 12 pct chromium steels.

In common with the super-alloys, alloys of this general family are face-centered cubic. This, of course, fulfilled one of the initial requirements. But before final percentages of cobalt and nickel

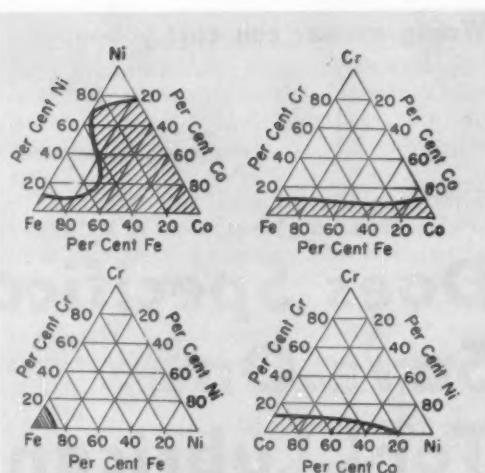


FIG. 1—Shaded areas of ternary diagram show alloy combinations with Curie temp. over 1200°F.

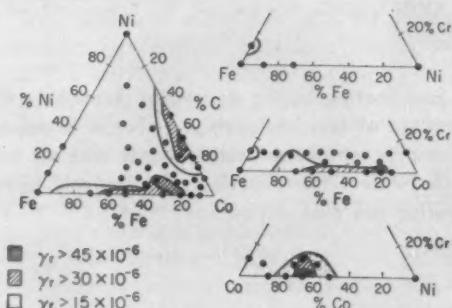


FIG. 2—Damping capacity of test alloys are compared with damping capacity of 12 pct Cr steel.

could be decided upon, a few additional damping measurements were made. As a final step, further improvement of properties was achieved by relatively small additions of minor elements.

The end product of these entirely logical procedures is an alloy that is not only "better," but one which can adequately fill the need for which it was developed. It is now ready to go to work in turbines operating at 1200°F because its properties at this temperature are similar to those of the 12 pct chromium steels at 900°F.

In terms of hot strength, Nivco has a 100-hour creep-rupture life of about 50,000 psi at 1200°F. At this same temperature, its measured damping capacity is about 10 times greater than that of many super-alloys at vibrational tensile stresses between 5000 and 10,000 psi. Its endurance limit—again at the same temperature—is in the vicinity of 45,000 psi.

Whether the technique used in developing Nivco is entirely original may be somewhat debatable. That it was used and that it resulted in the development of a highly desirable material is certainly most significant.

# Does Specification Buying Save On Tool Lubricants?

By JOHN A. BOYD, Vice President, Van Straaten Chemical Co., Chicago

◆ Specification buying is common enough in the purchase of tool lubricants . . . But is it enough to simplify set up chemical standards, then ask suppliers to meet them, leaving price the only factor favoring one over the others?

◆ The answer is an emphatic no, and here's why . . . Sulfur's a for-instance: three kinds are found in cutting oils, and two add little or nothing to improve performance . . . Alternative: replace inadequate chemical criteria with performance specs.

◆ KNOWING where specification buying works and where it doesn't work to get satisfactory quality and performance from lubricants suitable for machining operations can save plants both time and money. It can go further in some instances—saving what might otherwise amount to staggering production losses as well.

Successful specification buying of any product or material follows three principles. First, the specifications must be complete. Second, they must determine performance which can be reasonably expected. Finally, the specifications must be subject to checking and inspection by the buyer.

To illustrate the problems involved in specification buying of tool lubricants, let's take a look at the accompanying chart. The two typical specifications shown were taken from two separate plants. Either of these specification oils—or almost any other oils—would work if operations are extremely simple. Or they'd work if tool cost is a relatively unimportant factor in total production cost.

But specification buying succeeds in this kind of operation only because the quality of the lubricant is unimportant. Thus selling price becomes the only factor to consider.

Purchasing high-performance tool lubricants,

though, is something else again. Here, specification buying simply fails to provide the necessary quality in operation where adequate tool-lubricant performance is needed to control total cost. In order to develop satisfactory, workable specifications, and to keep them in stride with technological developments, the buyer would have to take on the task of setting up and maintaining a complete research department.

Just how specific are chemical specifications?

First, let's look at sulfur. This occurs in cutting oils in three separate forms—inactive, semi-active and active.

## Inactive sulfur adds nothing

In its inactive state, sulfur is held chemically in a non-functioning state. While it shows up in a chemical analysis or in a specification as total or combined sulfur, it will not function as a lubricant additive under any pressure or temperature condition.

What of sulfur's semi-active state? Here, sulfur is combined with fats or other organic compounds, and is available for action when a certain temperature or pressure is reached in the machining operation. For instance, the sulfurized fats have demonstrated extreme-pressure lubricant characteristics which are dependent on the

breakdown and release of sulfur under high-pressure, high-temperature conditions.

But sulfur can combine with any unsaturated hydrocarbon. This makes thousands of chemical variations available. The degree of efficiency of the final compound is thus dependent on the selection of the correct sulfurized additive that will function best at the temperatures and pressures reached in a given machining operation.

Active sulfur is the third form in which sulfur can occur. This kind is available in the metal cutting process under any condition of temperature or pressure.

Now all three of these forms of sulfur go into "total sulfur," a supposed specification factor. Obviously, sulfur thus loosely defined will not determine performance or serve as a check of quality.

Another chemical exhibiting the same range of variables as sulfur is chlorine. This can exist in thousands of organic compounds, with varying degrees of reactivity, toxicity, and total helpfulness in a cutting operation. Carbon tetrachloride is a good example. This has a readily available chlorine atom and so is an effective, though extremely toxic, additive in low percentages to cutting oils.

Toxic carbon tetrachloride doesn't have to be used for this chemical release of chlorine atoms. Other, non-toxic chlorinated organic compounds are available for cutting oil production.

But the specification should state exactly how the chlorine is to be combined and with what elements. Otherwise the specification will again have permitted the use of a substandard tool lubricant in a plant.

Fatty oil specifications can also be interpreted many ways chemically, depending on what result is desired. Generally, they're meant to indicate lard or similar oils, but they also include many organic compounds with varying lubricating abilities.

These are the three ingredients generally spelled out in most typical cutting oil specifications. But polar and wetting additives are other essentials to increase wetting, penetration and lubricity characteristics of oil for maximum metalworking performance. Today, in many cases, these unstated values overshadow in importance the commonly used specification factors.

#### Specifications fall short

It thus becomes obvious that most cutting oil specifications fail in the three essentials that successful specifications must have. They are not complete. They do not determine performance. And chemical analysis would not check performance characteristics.

Well, what's to do to overcome the faults of chemical specification buying? The answer: establish performance specifications.

Under this plan, the manufacturer sets up such performance specifications as tool life, finish and other operational requirements a product must meet. He then develops a program which accurately evaluates all cost factors involved in the plant's use of a tool lubricant.

The manufacturer's next step is to establish this performance program with the plan of lowering overall cost. Higher speed production and longer tool life can be set up as side objectives for even greater savings.

TAKEN from two separate plants, either one of these lubricant specifications would provide satisfactory oils if operations are extremely simple, or if tool costs are relatively unimportant.

	Specification A	Specification B
Total Sulfur:	1.5 to 2 pct	0.9 pct minimum
Active Sulfur:	.75 to 1 pct	
Chlorine:	0.5 maximum	0.17 pct minimum
Saponifiable (fatty oils):	3-6 pct	
Unsaponifiable (mineral oil):	92-95 pct	
Total fatty oil:		14 pct minimum
Viscosity:	150 to 165 seconds, saybolt, at 100°F	55-65 seconds, saybolt, at 100°F
Flash Point:	350° minimum	280°F minimum
Fire Point:	400°F minimum	280°F minimum

Joining mild steels?—

# How To Pick Electrodes for Production Welding

♦ SELECTING ELECTRODES for welding mild steel (and it accounts for by far the greatest volume of welding done today) appears an increasingly complex problem.

Actually, it isn't. Selection of the best electrodes for such applications boils down largely to a matter of job cost—of which electrode will make the joint in the least amount of time. About 86 pct of every welding dollar goes for labor and overhead costs, cost of electrodes themselves being a relatively negligible 8 pct or so.

Any joint being welded repetitively in production can be classified in one of three classifications to determine how it can be made in the least amount of time. It will require either a "Fast Fill," "Fast Follow" or "Fast Freeze." Certain types of electrodes are designed to meet these requirements best.

Take Fast Fill first. In making a fillet weld in plate which is  $\frac{1}{4}$  in. thick or thicker, a certain amount of metal must be filled into the joint to produce the necessary strength. The faster the metal is filled in, the lower welding costs will be. This is probably the most common Fast Fill application.

Another type of Fast Fill job is the deep groove butt weld. Here again, the job is to fill a void with metal in the least amount of time and, obviously, Fast Fill is needed.

For welding fillets which are in the downhand position, the best electrode is E-6024. Not only will it do the job in the least amount of time, but it will also have all the other operating characteristics needed for correct fillet welding.

This electrode is specifically designed for such work. It has high arc speed or deposition

♦ By far the largest volume of welding today is for joining mild steels . . . But with many electrodes to choose from, how do you narrow the field? . . . Simplest way is to let comparative job costs make the choice.

♦ Time and labor make up 85 pct of welding costs, so the fastest electrode's the best . . . Here's a rundown on which electrodes are best for Fast Fill-Fast Follow-Fast Freeze applications . . . Charts substantiate each choice.

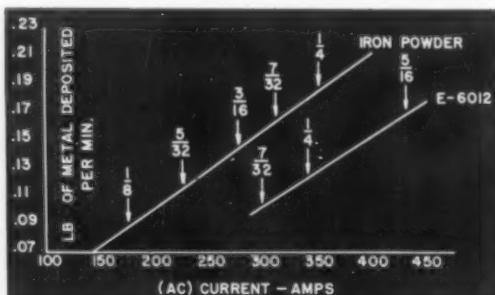
By J. E. HINKLE,  
Application Engineer,  
The Lincoln Electric Co.,  
Cleveland

rate because its primary job is to fill in a quantity of metal. It has easy slag removal; in fact, under some conditions, the slag is self-removing. Undercutting tendency, a problem with fillets, is reduced. Equally important to fillets, the weld metal is not crack sensitive.

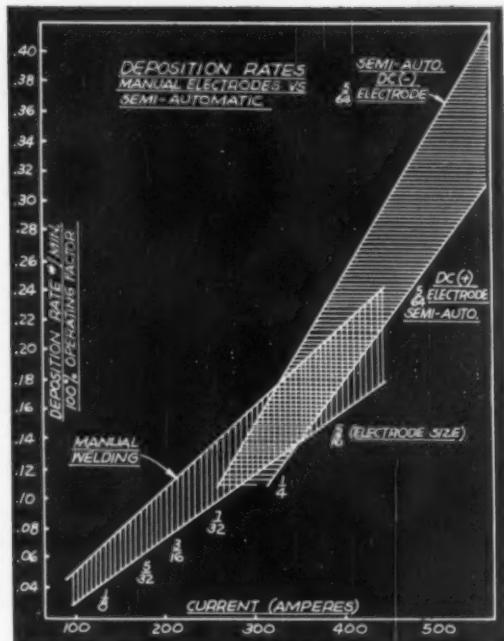
Another problem is Fast Fill welding of deep groove joints in the downhand position. For this, the electrode designer has created specifically the E-6027 electrode.

Weld metal here is of X-ray quality. The bead has excellent wash-in at the edges to maintain bead shape and the contour necessary to have an X-ray clear weld. It also has exceptionally good slag removal. This is important when welding in a groove, since slag becomes locked very tightly unless it is extremely friable.

What about welding Fast Fill joints that are not in the downhand position, but may be uphill, downhill, overhead, vertical or horizontal?



HIGHER DEPOSITION rates of iron powder electrodes make them ideal for Fast Fill work. Arrows indicate best current for fillets by electrode sizes.



**SUBMERGED ARC** deposition rates start where hand electrodes stop. The process should be considered for Fast Fill applications.

Here, the electrode to use is the iron powder type, E-6013. This is a fairly close duplicate of the E-6024 type, except that it has been somewhat altered to permit welding out-of-position. Additional arc force has been built into it. Among other things, this helps control the slag in out-of-position joints.

Comparing these electrodes with other types emphasizes the importance of using them for lowest-cost welding. Suppose for instance, we had to use an E-6020 electrode to make a  $\frac{1}{4}$  in. fillet.

#### Backed by statistics

The fastest possible procedure, welding at about 350 amperes, would produce a speed of about 12 ipm. With a  $\frac{3}{16}$ -in. size E-6024 electrode, operating at about 275 amps, the same size fillet can be easily produced at 15 ipm. A corresponding increase can generally be shown with an E-6027 electrode in a deep groove weld.

For statistical backing of which electrode is best to produce a Fast Fill, let's turn to the accompanying table showing a deposition rate curve.

On this chart, the vertical line to the left records pounds of metal deposited per minute. The horizontal line at the base of the chart indicates the welding current. Only two different electrodes are plotted. The lower line off to the right represents the fastest E-6012

type electrode, and the line at left top, the E-6024 type.

Small arrows mark the optimum current for each size of both types. It is readily seen that, even if a reduction in wire size is made, as is generally recommended when using the E-6024 type, the deposition rate at optimum current is still higher.

When considering procedure selection for Fast Fill joints, careful evaluation of submerged arc welding must be made. Deposition rates of hand welding are advancing, but, at present, the maximum approaches  $\frac{1}{4}$  lb per minute. The submerged arc welding process rate of deposition starts where hand welding stops.

#### Sometimes no fill's needed

Although many welding jobs require Fast Fill, some—for example, welding thin gauge sheet metal—require no fill at all. With a lap weld, one plate entirely overlaps the second, so that, as far as available plate is concerned, no additional metal would have to be melted, if the top member could be fused into the bottom member. The same thing is true, to a lesser extent, with a fillet weld.

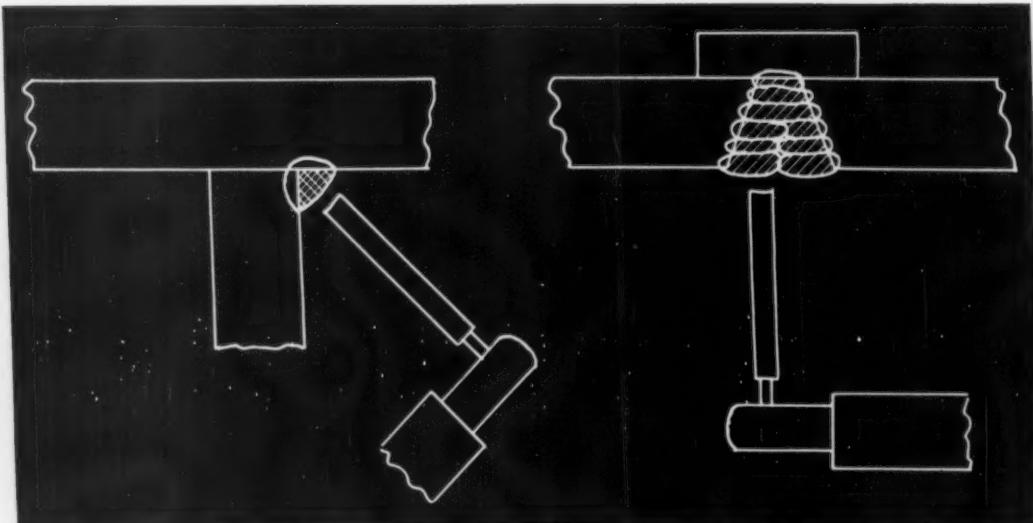
In sheet metal welding with the metallic arc process, any weld which is continuous and uniform is actually overwelded. It is not possible to make one too small because the resultant weld has more cross-sectional area than the plate itself.

Under these conditions, the fastest way to make the joint is to move the electrode as fast as possible. Limiting factor, however, is the speed at which the molten crater will continue to make a satisfactory weld. To speed up welding, it is necessary to make the crater follow the arc as rapidly as possible—Fast Follow.

The difference between a fast or slow following crater is not too easily observed, except by a skillful welder. It could be seen more clearly if a stick feed device were used to feed an electrode with a travel carriage setup and the necessary adjustment to control current and speed. With this setup, by constantly increasing arc speed from 15-20-30-40 ipm, the difference in follow can be observed.

For example, consider the carriage set at 20 ipm. This might make an excellent weld. An increase to 25 might still prove acceptable and perhaps even to 30. But somewhere along the line the speed would become too great, and the metal would not follow the arc.

Effect would be something like a "skip-bombing." A weld would be made for a short space, then a space would be skipped; a few balls of metal would flow out, not properly spreading, weld again would occur and stop, etc., resulting in an unsatisfactory weld. At this point, the electrode in the machine could be changed to one designed to reduce the surface tension



OVERHEAD and vertical "Fast Freeze" joints are welded most economically with E-6010 electrodes.

action of the weld metal, and the speed of welding can be stepped up to a still higher level.

This characteristic of Fast Follow does not become a factor to consider until welding speeds of about 20 ipm are being used. Of course, sheet metal jobs can be welded satisfactorily at 10-15-20 ipm. But considering that virtually no weld metal is needed to do the job, it is a mistake to continue with slow speed, high cost procedures. Speeds of 40, 50 and even up to 100 ipm should be the goal in welding Fast Follow applications.

#### E-6012 type's best

Best electrodes available for this job are the E-6012 type and some that are described as "special" E-6012. These latter are E-6012 by general classification, but may not be listed as such. This type electrode makes a smaller bead than almost any other and has been designed to give good Fast Follow results.

In situations where only AC current is available, E-6013 electrodes are used for sheet metal. But this combination does not offer the speeds possible with DC and E-6012's.

In welding a joint in any other than the ideal downhand position, the welder must contend with force of gravity.

Electrodes best suited for welding in overhead or vertical position are designed so that the molten metal freezes rapidly to help counteract this. The joint may be such that it requires both Fast Fill and Fast Freeze, such as an overhead deep groove butt weld.

For such joints, a compromise must be accepted, since Fast Fill and Fast Freeze characteristics are inclined to be incompatible. Both would be desirable. But of the two, Fast Freeze

These are also best for sheet metal applications requiring both "Fast Freeze" and "Fast Follow."

is absolutely essential, and the compromise must be made in this direction.

When Fast Freeze is the required characteristic, the best answer may be found in the lightly coated electrodes, E-6010 and E-6011. Since the freezing rate is influenced greatly by the amount of slag present, the low slag, organic types, E-6010 and E-6011, are best suited.

An electrode with a good share of both Fast Fill and Fast Freeze characteristics is the all-position, iron powder electrode, E-6013.

Some welding jobs, such as an edge weld on sheet metal, require a measure of Fast Freeze and Fast Follow, especially when welded downhill. For applications of this type, E-6010 and E-6011 provide the best choice.

Weldability is another factor. When welding steels that may produce cracks, the primary consideration is to make a crack-free weld. This means more than speed or appearance or any other factor.

For such welds, an electrode should be used that has been designed to be less sensitive to cracking. Electrode choice will depend on the severity of the problem. Welds in steel in the 0.30 to 0.40 carbon range can, under favorable joint conditions, be welded with an E-6024.

The E-6015 and E-6016 electrodes, however, have been designed especially for this job. They are the first consideration. Two types of low hydrogen electrodes with iron powder coatings are available. Electrodes with 30 pct iron powder coatings are for out-of-position welding where some Fast Fill and Fast Freeze characteristics are required.

For downhand welding, electrodes with 50 pct iron powder coatings will give Fast Fill characteristics with minimum cracking.



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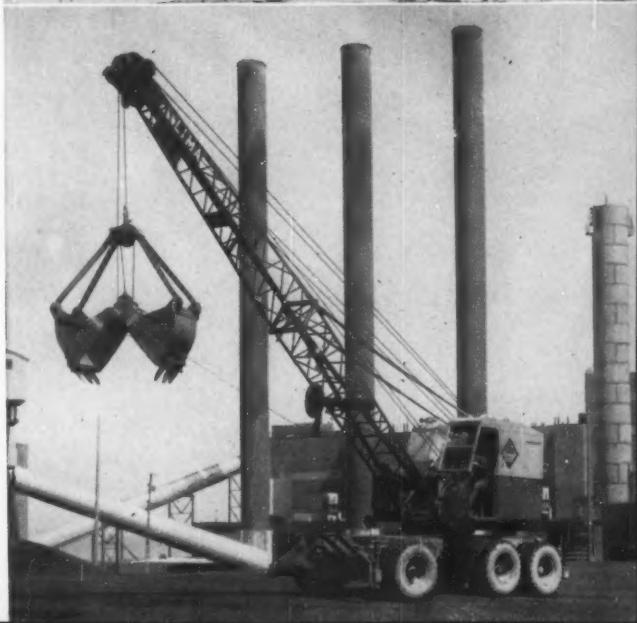
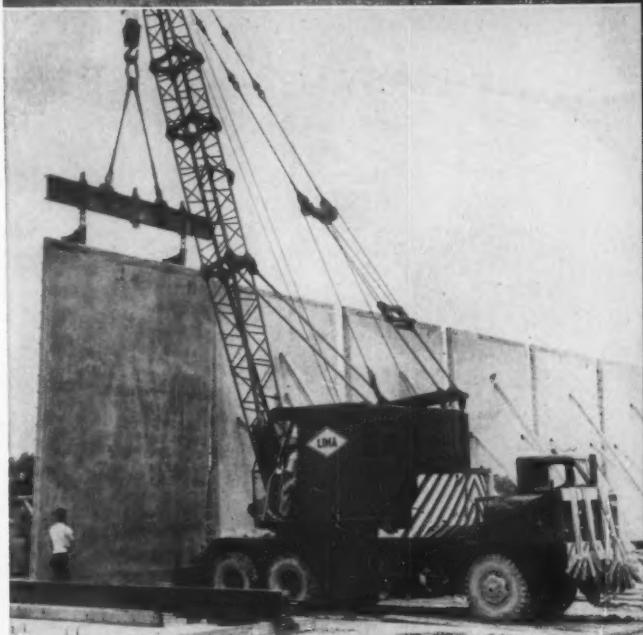


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### Catalogs and Bulletins

#### Smoke controller

Data sheet describes revised Brooke smoke density system using Brown electronic recorders. Good combustion efficiency and compliance with anti-smoke laws are said to be assured by this equipment. Features guarantee clean lenses and long, dependable service life. *Minneapolis-Honeywell Regulator Co.*  
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#### Electronic micrometers

Bulletin just issued pictures four reference standard electronic micrometers for making direct measurements to 20 millionths of an in. *J. W. Dice Co.*

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#### Grinding handbook

Tool room grinding handbook combines information previously found in three booklets covering general tool grinding, carbide tools and cast alloy tools. The 222-page handbook is said to be one of the most complete and up-to-date reference books for tool room use. *Norton Co.*  
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#### Metal powder cutting

Metallic powder cutting equipment for cutting and washing stainless steels, other high alloy steels and cast iron is presented in a new folder. Both vibratory and pneumatic type powder feeders, along with hand and machine torches, are illustrated and described. *Air Reduction Sales Co., div. of Air Reduction Co., Inc.*

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#### Marking machines

Brochure illustrates equipment, from light-duty bench mounted units to heavy-duty, automatic machines for marking round, flat and contour-surfaced products. Specifications for standard models are given along with a short description of each type of unit. Adaptations of each model are available for special marking applications, and several of them may be designed for integrated, automatic production line marking. *Jas. H. Matthews & Co.*

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#### Hydraulic valves

Manufacturer of hydraulic valves and coolant pumps has just published a new mechanical data book. It is colorfully illustrated with photographs, charts and drawings and contains technical information on the installation and maintenance of oil-relief, by-pass hydraulic valves. *Fulflo Specialties Co.*

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## Butterfly valves

Specification sheet describes line of V-Port butterfly valves for precise control of air or gas. Valves are of the rotating vane type. This is said to assure good control characteristics over a wide turndown range. Self-cleaning construction makes them suitable for applications involving dirty gas. Excessive dirt accumulations can be quickly and simply removed from valve's body without uncoupling it from the gas line; the vane is removable. V-Port butterfly valves are used in the steel industry for gas flow and pressure control of metallurgical furnace installations. Sizes include 6 to 12 in., with ASA flanged ends according to the manufacturer's literature. *Hagan Corp.*

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## Soldering to silver

Discussion on silver scavenging, alloy selection, applications and available alloys are found in an informative bulletin. A graph, designed to help determine the proper alloy for use in a particular application is also included. *Alpha Metals, Inc.*

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## Steel van

Trailer company has just issued a brochure on its smooth panel, hi-tensile steel van. It describes construction details, its 35 pct extra payload capacity, and other advantages. *Fruehauf Trailer Co.*

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## Product catalog

Corporation has made available fully illustrated, indexed 70 page catalog describing its principal products. It is divided into broad classifications which include semi-finished and hot-rolled steel, heavy and special steel items, rails and accessories, wire and wire products, Wickwire rope, overhead conveying equipment, industrial screens and wire fabrics, hardware products, springs and formed wires, processing belts and various other product lines serving the mining, agricultural, chemical and construction industries. *Colorado Fuel and Iron Corp.*

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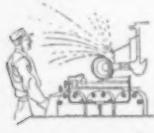
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This section starts on p. 108.

## Welding studs

Folder containing several fact-sheets announces and explains a new type welding stud. Advantages possessed by this stud, literature says, include: (1) greater strength, (2) improved welding qualities, (3) lower price and (4) immediate delivery from stock. Specification sheets and price list is included. *Nelson Stud Welding, div. of Gregory Industries, Inc.*

For free copy circle No. 16 on postcard, p. 113

## Metal stamping

"If it's a stamping . . . We can make it." Such is the introduction, title and theme of one company's new four page folder. Why is this possible? Page two answers that with three illustrated paragraphs of text (i.e.: men, facilities, machines). Still another reason is the firm's experience. On one government inspected job, folder describes how close tolerance, one-piece stamping was achieved. Draw on this was  $6\frac{1}{2}$  in.; ID, 3 in.; wall thickness, 0.062 in.  $\pm$  0.002; shoulder thickness, 0.290 in. *Carlstrom Pressed Metal Co., Inc.*

For free copy circle No. 17 on postcard, p. 113

## Pressure switch

A new pressure switch, capable of sensing two different pressures in one system and actuating independent electrical circuits at any two desired points, is described in company's written matter. The piston type sensing element of this switch is expected to perform millions of cycles under fast, continuous operation. It is described as not sensitive to jarring or vibration. *Barksdale Valves.*

For free copy circle No. 18 on postcard, p. 113

## Sodium orthosilicate

Eight-page booklet discusses various metal cleaning and laundry applications of sodium orthosilicate. It concisely presents physical and chemical properties, packaging and safety precautions. Sections on electrolytic and spray cleaning in the metal cleaning field point up advantages of the chemical with special attention drawn to its high electrical conductivity, good emulsification and saponification characteristics. *Dow Chemical Co.*

For free copy circle No. 19 on postcard, p. 113

**Coil feeding**  
Reading matter describes a complete new series of improved Koil-Kradles. Handling coil stock up to 48 in. wide and 60 in. in diam, in capacity ranges from 1200 lb to 16,000 lb coils, these units said to be capable of supplying and maintaining a slack loop from which any automatically fed machine can draw. Latest improvements described include a new actuating linkage that increases operation versatility without attachments or accessories. Larger models operating on 220 or 440 v are equipped with J.I.C. type motor controls. *Benchmaster Mfg. Co.*

For free copy circle No. 20 on postcard, p. 113

## Nickel-brass rod

Low-fuming, high-strength, versatile nickel-brass rod for brazing and braze-welding with the oxy-acetylene process is covered in a new bulletin. Included are its uses in industry and small shops characteristics, deposit mechanical properties, specification information, application, standard sizes, etc. *Ampco Metal, Inc.*

For free copy circle No. 21 on postcard, p. 113

Postcard valid 8 weeks only. After that use own letterhead fully describing item wanted. 9/6/56

Circle numbers for Free Technical Literature or Information on New Equipment:

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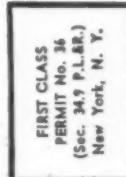
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THE IRON AGE  
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## FREE TECHNICAL LITERATURE

### Truck engineering

Truck engineering bulletin illustrates and describes a new line of die handling trucks for inclined presses. Trucks eliminate problems normally encountered in die handling on and off medium to large sized inclined presses, bulletin says. Design and operation are covered. *Elwell-Parker Electric Co.*

For free copy circle No. 22 on postcard, p. 113

### Here's the "Facts"

Magazine-like publication titled "Facts" covers one firm's tractors, motor scrapers and road graders. Sixteen pages cover such typical items as: new methods, preventive maintenance and dealer relationship. Numerous action photographs show various bulldozers, graders, scrapers at work. Machinery for practically any foreseeable construction job is illustrated and reviewed in brief. Attractive layout makes for easy reading. Small color silhouette drawings enable fast identification of models. *Allis-Chalmers Mfg. Co.*

For free copy circle No. 23 on postcard, p. 113

### Resistant coatings

Illustrated bulletin now available describes three general classes of chemical-resisting organic coatings developed for processing industries. These are: (1) coating systems applied like paint for general corrosion control, (2) plastisol compounds for heavy-duty service and (3) special materials for lining steel drums and tanks. *Metal & Thermit Corp.*

For free copy circle No. 23 on postcard, p. 113

### Welding and cutting

Two new, light range oxy-acetylene outfits are described in a fully-illustrated six-page folder recently published. These are described as designed especially for production welding and limited cutting of light-gage metals in aircraft and small parts manufacture, and for repair and maintenance operations in auto body shops, sheet metal shops, and garages. Both outfits feature a new blowpipe capable of welding metals from 32 gage to  $\frac{3}{8}$  in. *Linde Air Products Co.*

For free copy circle No. 27 on postcard, p. 113

### Lubrication gun

Well illustrated catalog page describes die set lubrication gun. Gun is said to make die set lubrication easier than ever before. The long narrow shape of the gun makes it simple to reach guide post bushings from the front or side of the press. The nozzle regularly furnished with the gun is designed for use with oil or grease. *Danly Machine Specialties, Inc.*

For free copy circle No. 24 on postcard, p. 113

### Snagging wheel

Leaflet gives introduction to a new snagging abrasive wheel for billet, slab and heavy duty grinding. Capsule run-down on its various merits is contained. Photomicrographs compare this wheel with an ordinary one. Literature offers an on-the-job test of the grinding wheel to those interested. *Sterling Grinding Wheel Co.*

For free copy circle No. 28 on postcard, p. 113

### Hardware catalog

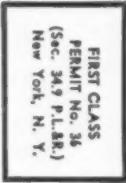
Company's latest hardware catalog of drills, drill sets, drill assortments, reamers and countersinks has been issued. Tools listed are made of high speed, carbon steel and carbide for use in steel, wood, masonry and glass. They are available in complete size ranges and attractively designed cases. *Chicago-Latrobe.*

For free copy circle No. 29 on postcard, p. 113

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**Send for  
FREE  
DATA  
BOOK**



**BURT MANUFACTURING COMPANY**

920 S. High St., Akron 11, Ohio

Please send me Bulletin SPV-12A on  
your new Centriflow Ventilators.

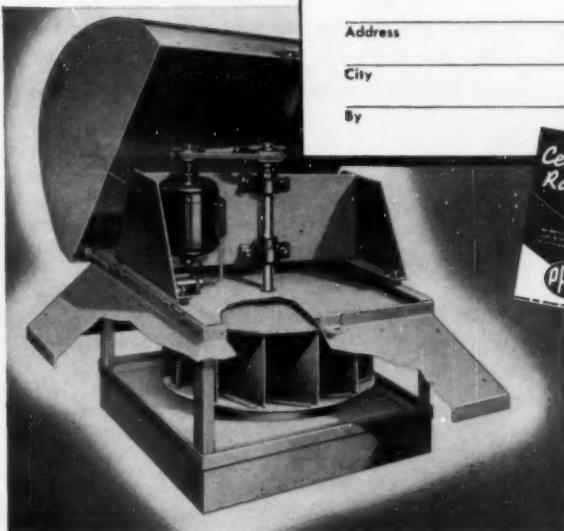
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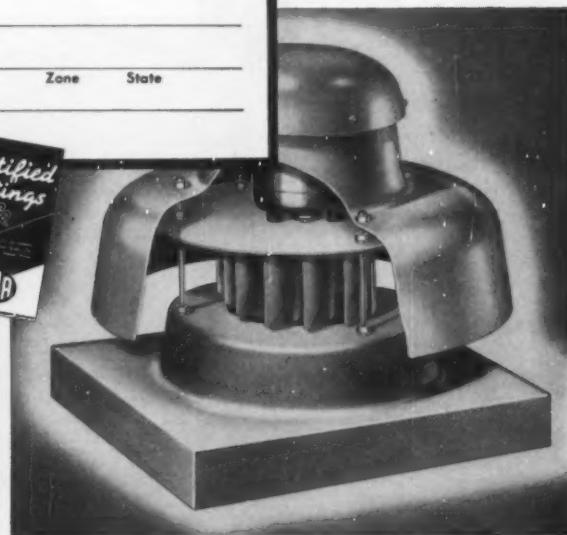
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**BURT V-BELT DRIVE CENTRIFLOW**

Fit standard roof curb outlets. Power drive in separate enclosure supported on resilient rubber vibration eliminators • Hinged top for easy maintenance • 3 basic damper types • Motors in all power characteristics from 1/6 to 7-1/2 H.P. • Oversize V-belt and sheaves • 13 basic sizes • Capacities from 675 c.f.m. to 36,430 c.f.m.



**BURT DIRECT DRIVE CENTRIFLOW**

Shipped complete ready to install on roof curb. Low profile spun aluminum with stainless steel supports • Motor in separate compartment on rubber vibration pads for quiet operation • Easy servicing accessibility • 4 basic damper types • From 1/12 to 1/2 H.P. • 2 basic sizes • Capacities from 408 c.f.m. to 2508 c.f.m.

# ANNOUNCING

## BURT CENTRIFLOW FAN VENTILATORS

**Two New Q-U-I-E-T Centrifugals with P.F.M.A. Certified Ratings  
For Schools, Hospitals, Public, Commercial and Industrial Buildings**

High efficiency, slow speed and quiet operation are assured with new Burt Centriflow Fan Ventilators. And every Burt Centriflow carries the P.F.M.A. label that guarantees its rating to be authentic. Certified capacities range from a low 408 c.f.m. to 36,430 c.f.m. Centrifugal wheels are backward curved blade in non-overloading design. For the complete story, send for the new Burt Centriflow Data Book — just off the press. It's FREE to you.

**FAN & GRAVITY**

**VENTILATORS • LOUVERS • SHEET METAL SPECIALTIES**

**THE**

**Burt**

**MANUFACTURING COMPANY**

920 S. HIGH ST.

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# ULBRICH Stainless Steels

Immediate Delivery  
from Stock

## STRIP • Flat Wire and other Stainless Steels

a foot or a pound  
and up

To your EXACT requirements  
from the BIGGEST little Con-  
verting Mill in the country.

Complete  
Inventory

Phone:  
COLONY 9-7771  
Wallingford, Conn.  
Established 1924



# WARD STEEL CO.

## PROMPT WAREHOUSE SERVICE ONLY

Most Complete Stock in  
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## BLUE TEMPERED SPRING STEEL

We believe that the way to sell is to  
carry a stock which permits satisfying  
any reasonable warehouse demand.

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3042-3058 W. 51st Street, CHICAGO, ILL.  
Phone: Grovehill 6-2600

## TECHNICAL BRIEFS

## INSPECTION: Tiny Holes

Entire day's production fits into a thimble . . . Holes  
0.0008 in. in diam are drilled . . . A problem arises: How do  
you measure these at a rate of 1800 an hour?

If the average foreman told the average production manager that the entire day's average finished work would fit into an average thimble, that would be a problem—and not an average one.

However, a leading watch manufacturer produces tiny jewels used as non-friction bearings in just such quantity. They are satisfied with this output, too. Some problems do arise though. For instance, each miniature bearing must be drilled with a hole 0.0008 in. in diam. Drilling the hole is difficult enough; controlling its almost non-existent tolerance is almost inconceivable.

### WANT MORE DATA?

You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.

"great accuracy and speed to spare."

This gage measures the holes and sorts them into four acceptable categories plus oversize and undersize, at a speed to 1800 pieces an hr. The four good classifications differ by 0.0001 of an in.

Because ordinary gaging contact will not fit the hole, measurement is made by inserting a tapered, needle-like contact and measuring its penetration depth. The needle is connected to an electronic gage head by means of a frictionless motion-transfer unit. The penetration depth determines the size category of the jewel.

In this type of measurement, the needle's taper is extremely critical and must be held to close tolerances to be sure that the size of the needle does not affect the measurement.

Gaging takes place one at a time. With the hole in a vertical position, the needle is inserted. The resulting measurement is sent to an electronic classifier. This signals a rotating wheel containing the disposal cups so that the correct cup will be under the chute to receive the jewel. There is a cup for each size category, plus those for undersize and oversize. Disposal cups are about the size of a thimble, yet they hold an entire day's production.



This device enables inspection  
and measurement of tiny holes.

Measuring jewels by hand is difficult, slow and tedious. They are too small for easy handling and it is necessary to check several thousand a day just to keep up with production.

### "The Logical Choice"

To solve the problem, the company decided on automatic gaging. This, the firm says, was "the logical choice." Federal Products Corp., Providence, R. I., was called in. They developed a high-speed, automatic electronic sort-and-dispose gage that does the job with

## Metals:

**Stainless steel assemblies  
cut oil consumption.**

New stainless steel automobile oil ring assemblies for pistons in extensive tests have proved that "considerably better than 1,000 mi. per qt of oil can be obtained with the new rings while considerably less than 1,000 mi. per qt of oil were obtained with the old style rings."

This is what one large automobile manufacturer reported after testing the new stainless steel oil ring assemblies.

For the first time in automotive history stainless steel oil ring assemblies for pistons will be used. This new piston ring development shows promise of giving today's



**New stainless steel rings allow  
1000 mi. per quart of oil.**

auto drivers better oil economy, better engine protection and longer engine life.

The new piston ring development uses a completely new design, a new material for this use and a different method of manufacture than was used in making piston ring assemblies before.

### Research Program Began

The research program on the new stainless steel expander-spacer began about three years ago at Sealed Power Corp., Muskegon, Mich., and was accelerated about a year ago when just a few of the "bugs" had yet to be worked out. Sealed Power worked with Allegheny Ludlum Steel Corp., a primary producer of stainless steel, who provided the stainless steel for the project.

# MORE WORK . . . FASTER! WITH ERIE STRAYER HOOK-ON CLAMSHELLS



### CHECK these exclusive features:

- ✓ EASY HOOK-ON—no changeover problem. Versatile.
- ✓ COMPACT, RUGGED DESIGN—longer, tougher service.
- ✓ LIMITED HEADROOM REQUIREMENT—made for tight spots.
- ✓ ALWAYS UNDER PERFECT CONTROL—eliminates shock.
- ✓ 1/4 TO 10 YARD CAPACITY—models to suit your needs.

THE FAMOUS STRAYER ELECTRIC BUCKET  
ALSO AVAILABLE FOR AC OR DC OPERATION

For Catalogs and General Information, Write:



**ERIE STRAYER CO.**  
GEIST ROAD • ERIE, PENNSYLVANIA

At first type 301 stainless steel was used but later the newer type 201 stainless steel (chrome-nickel-manganese) was used and found to work better in this application. The comparatively new family of 200 series of stainless steels was pioneered by Allegheny Ludlum. Sealed Power reports that the yield point is higher in 201 than 301, which means that the ring retains its tension over a longer period of

time, a definite asset in this application. There are two types of piston rings in automobiles. There are the compression rings, usually two, which are used to seal the cylinder against the forces of compression and explosion.

#### Ring Has an Expander

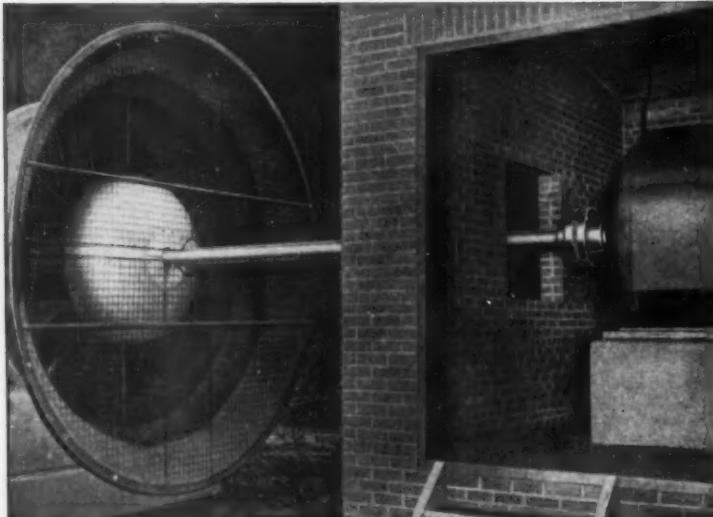
Then there is the oil ring, usually one, which has an expander and spacer to hold the ring against the

sides of the cylinder wall.

The oil ring assembly permits a tiny fraction of a drop of oil to pass up the cylinder wall to lubricate the compression rings and cylinder wall. The better this assembly operates, the better oil distribution is maintained with less oil being consumed and the longer the engine will last at maximum efficiency.

The oil ring assembly was formerly made of carbon steel. Stainless steel is being used by Sealed Power Corp. in the critical expander-spacer for the oil ring.

## Eliminate Intermediate Bearings!



By using Thomas Flexible Couplings on long, unsupported shafts, intermediate bearings are eliminated. Thomas engineers tubular shafts free from lateral whip.

The large fan shown above is 16' from the motor to allow sufficient air intake. Miners working underground receive their fresh air supply from this fan and others like it,

which have been giving dependable service for as long as fifteen years... without shutdowns for lubrication or maintenance of the couplings. Thomas floating shaft flexible couplings are recommended for machine and marine drives, printing presses, paper and cement mills, cooling towers, diesel engines, pumps, compressors, and many other uses.

#### Only Thomas Flexible Couplings offer all these advantages

UNDER LOAD and MISALIGNMENT

1. Freedom from Backlash—  
Torsional Rigidity
2. Free End Float
3. Smooth Continuous Drive with  
Constant Rotational Velocity
4. Visual Inspection in Operation
5. Original Balance for Life  
... and

THOMAS ALL METAL COUPLINGS HAVE NO WEARING PARTS  
SO LUBRICATION AND MAINTENANCE ARE ELIMINATED

Write for Engineering Catalog 51A

**THOMAS FLEXIBLE COUPLING COMPANY**  
WARREN, PENNSYLVANIA, U.S.A.

## Handling:

### Improved delivery, no stick lining are can advances

Can deliveries, can handling and canned meat packing recently reported some new advances. The new delivery system has been installed at the F. & M. Schaefer Brewing Co., Brooklyn, N. Y. It furnishes high speed can feeding and eliminates the need to store various filled carton packs of empty cans.

#### Can Loaded Onto Bins

Some 9000 cans are loaded into plywood bulk bins. These are almost 90 in. high, 90 in. wide and 48 in. deep. Bins are mounted on runners to permit handling by fork trucks.

Several of these bins are loaded into a street trailer, the company reports. The bins are placed on a non-powered roller conveyor and pushed into the trailer body.

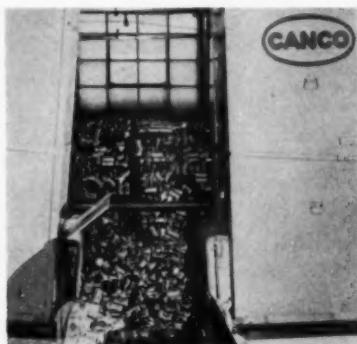
#### Fork Truck Moves Bins

At the brewery, a short section of platform conveyor is lined up with the conveyor in the trailer body and the bins are pulled off onto the platform section of the conveyor. The bins are then moved to feeding stations by fork truck. There they are emptied through a gate on the narrow end of the bin that dumps the cans onto the conveyor that feeds into the unscrambler.

The action of the conveyor belt carrying the cans into the unscrambler is electrically controlled,

causing the belt to move as required by the fillers. When the conveyor is at rest, the cans already on the belt stop the flow from the bin. After the bins are emptied, they are placed on the platform conveyor by fork truck and pushed into the trailer for return to the can plant. Each bin holds about 20 per cent more than similar jumble packed shipments.

Meanwhile, American Can Co., developers of the handling system, has announced development of a "no-stick" enamel can lining that permits meat products to slip easily



**Cans are dumped onto conveyor that feeds into an unscrambler.**

out of opened containers in loaf or bulk form. Still another can development is a new self-tracking tear-strip that makes for much easier opening of key-open cans. Double-beading of the tear-strip provides "tracks" to keep it winding smoothly and easily while being turned on the key.

### **Power:**

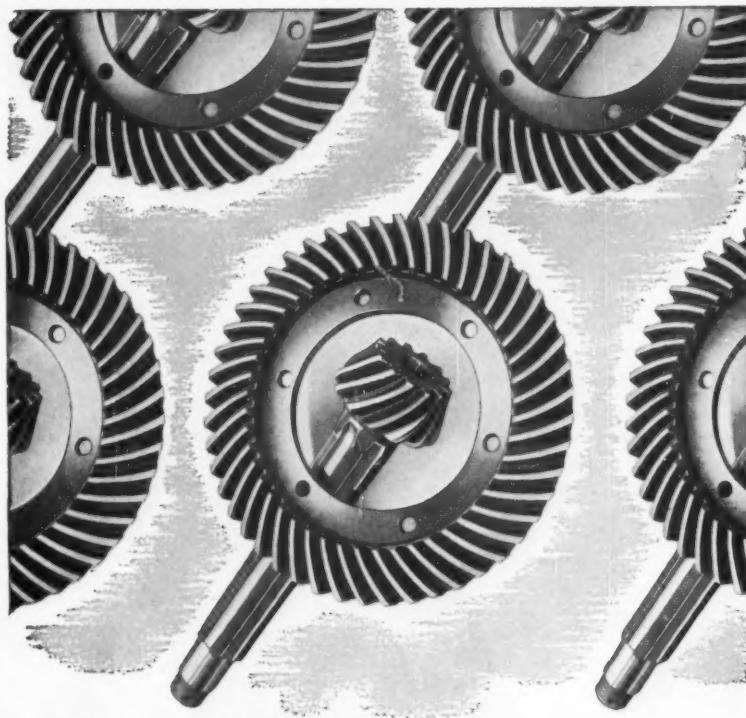
**Drilling units give continuous power**

Drilling rig power units are said to be proving themselves in service in the Gulf Coast oil fields.

Four power packages have been in service, one for more than a year, and have given continuous motive power for drilling without a single failure.

### **Drilled Seven Wells**

One power package drilled seven wells to a total of 70,855 ft., including three of the directional



*Over and over again...*

# **FAIRFIELD**

**SAVES YOU MORE ON TOP-QUALITY GEARS**



- Send for your copy of illustrated bulletin describing Fairfield's facilities for making gears.

*Fairfield is famous for repeat orders—and simply because quality is consistently high, and price is—well, just try to beat it!*

How can Fairfield manage this unique position year after year? Truth is, it involves some tried-and-true mass-production methods plus some very special Fairfield ideas developed in the past 35 years of precision gear making.

Then, of course, Fairfield is ideally located with all facilities *under one roof*. Here you will find a complete metallurgical department, batteries of the most modern machines, testing laboratories, latest heat-treating equipment—all operated by skilled craftsmen working under expert engineering supervision.

*There's another Fairfield service worth looking into—the expert recommendations on your particular gear problems. Your inquiry will receive prompt attention.*

**FAIRFIELD  
MANUFACTURING CO.**



2319 SOUTH CONCORD ROAD • LAFAYETTE, INDIANA

## TECHNICAL BRIEFS

type totaling 28,389 ft. The first six of these were completed in 86½ days of actual drilling time.

### Basic Power Package

The basic power package includes two skid-mounted engine-generator sets, a 1370 hp draw-works drive assembly, two 600 hp mud pump drive assemblies and complete electrical controls. Each of the new six-cylinder model die-



**Power units run generators, drilling equipment, auxiliary system.**

sel engines drives two excitors and main generators, which furnish power for two motors for hoisting and one motor on each mud pump. They are built by Alco Products, Inc., Schenectady, N. Y.

### Auxiliary Generators

The main engines also run auxiliary generators which power motor excitation, blower motors and the control system. Equipment and power switching is arranged so that either engine-generator set can supply, at full torque, all necessary operations for drilling or hoisting.

Variable-voltage electrical control permits changing motor speeds with a constant engine speed. This eliminates waiting for engine acceleration. Separately excited shunt-wound motors combined with generators of matched characteristics reduce the chance of chain-drive failure inherent in other types of control systems.



A call to any one of our seven warehouses will get you speedy service on your order... whether it's for *alloy steel bars, billets or forgings*, in any size, shape or treatment you need.

All seven warehouses are located in principal industrial areas. Each is modern and well-stocked, and staffed by expert metallurgists.

Call now if you need our own HY-TEN steels — "the standard steels of tomorrow", or standard AISI or SAE grades.

Or write for *free* copies of Wheelock, Lovejoy Data Sheets. They contain complete technical information on grades, applications, physical properties, tests, heat treating, etc.

*In Canada: Sanderson-Newbould, Ltd., Montreal and Toronto*

**WHEELOCK, LOVEJOY & COMPANY, INC.**

126 Sidney Street, Cambridge 39, Massachusetts



## New Books:

"Management For Tomorrow" is a proceedings report on the 8th Annual conference of the Society for the Advancement of Management. It gives a sleeves rolled up, hair let down review of verbal sharpshooting on business and industry subjects. Observations are given by management leaders, including: H. Thomas Hallowell, Jr., Standard Pressed Steel President; Vernon D. Northrop, Ex. V.P., Phila. Food Distribution Center; G. Raymond Killian, Philco Corp. General Auditor; W. C. Cooling, of International Resistance Co. and Howard MacDonald of Minneapolis-Honeywell. Many subjects pertaining to management are covered. 195 pp. 88 illustrations. Available at bookstores. \$6.00 per copy. Chilton Co., Chestnut & 56th Streets, Phila. 39.

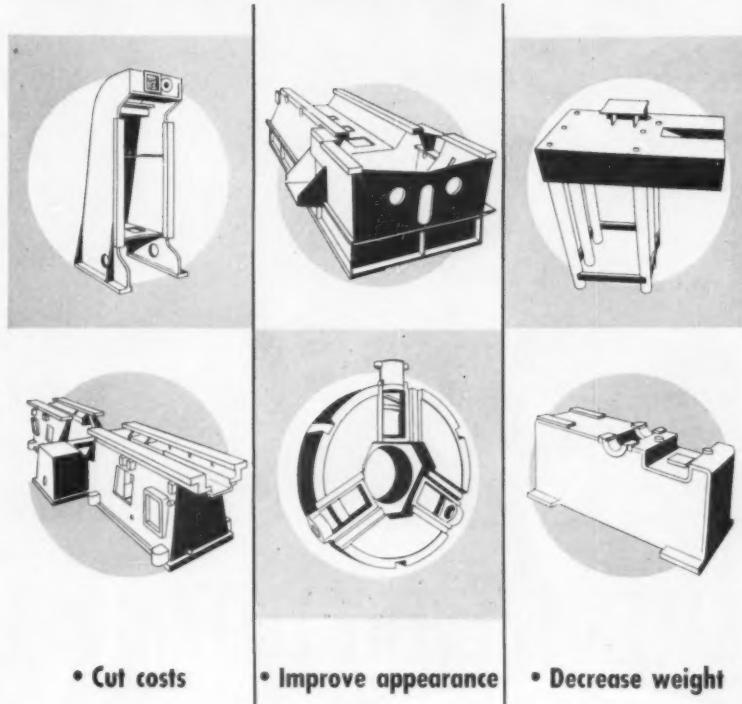
"Traffic Department Organization," by John H. Frederick points out that transportation is the largest single item left in the controllable cost area. In this first book on the subject the author uses case histories from Sears, Roebuck; H. J. Heinz; National Distillers; American Chain & Cable; Kaiser Aluminum & Chemical; Maytag; Koppers; Remington Rand and others to show how a new concept of traffic management has pared costs and produced savings in freight, other business areas. 160 p.p. \$6.00. Chilton Co., Chestnut and 56th Sts., Phila. 39.

"Industrial Truck Specifications" is a revised and expanded listing, including complete data on high and low lift fork and platform trucks, non-lift platform trucks, towing tractors, straddle carriers and end-loaders (shovel). Some 845 models are covered. Price per copy: 75 cents; \$19 per 100. *Distribution Age*, Chestnut and 56th Sts., Phila. 39.

"Atoms and Energy," by Prof. H. S. W. Massey, gives a non-technical account of Atomic Physics' development. 174 pp. \$4.75. Philosophical Library, Inc., 15 E. 40th St., New York 16.

# ENTERPRISE

## WELDMENTS



Weldments can save you money — on pattern costs, reduction of metal tonnage, on shipping and handling. As designed by ENTERPRISE, they usually give you extra savings in time and labor costs, too.

Weldments can make your job look better — by reducing bulk, and by taking full advantage of the newest forming equipment. ENTERPRISE engineers know how to streamline bulky, heavy pieces—and ENTERPRISE is

equipped to follow-through with speed and economy.

Lighter weight, accompanied by increased strength, is a typical weldment "bonus." It saves you money—makes expensive jobs reasonable, difficult jobs practical—and gives you an important new sales feature.

Check what ENTERPRISE Weldments can do for You.

Write or phone us for information or quotation on any job. Absolutely no obligation.



**THE ENTERPRISE COMPANY**

Columbiana, Ohio, U. S. A.



## SAVES ON EVERY LIFTING JOB



On the roughest, toughest heavy-duty cycle — or ordinary lifting jobs — the Series "700" 'Load Lifter' Electric Hoist gives you the best in load-handling performance and safety. It is a smooth-operating hoist, engineered to lift *fast* at the push of a button. In 2 seconds, a 1-ton load can be lifted a foot! It was the first hoist to have safe 24 volts at the pendant push-button.

Get new speed and cost-cutting power into your load handling with the Series "700" 'Load Lifter' Electric Hoist. Rarely needs maintenance, even under the most adverse operating conditions. Can be serviced *in the air*. Capacities up to 15 tons. Single and two-speed models. All types of suspension. Check with your "Shaw-Box" Distributor for details or write us for Bulletin 410.

***Load Lifter***  
ELECTRIC  
HOISTS



MANNING, MAXWELL & MOORE, INC.  
MUSKEGON, MICHIGAN

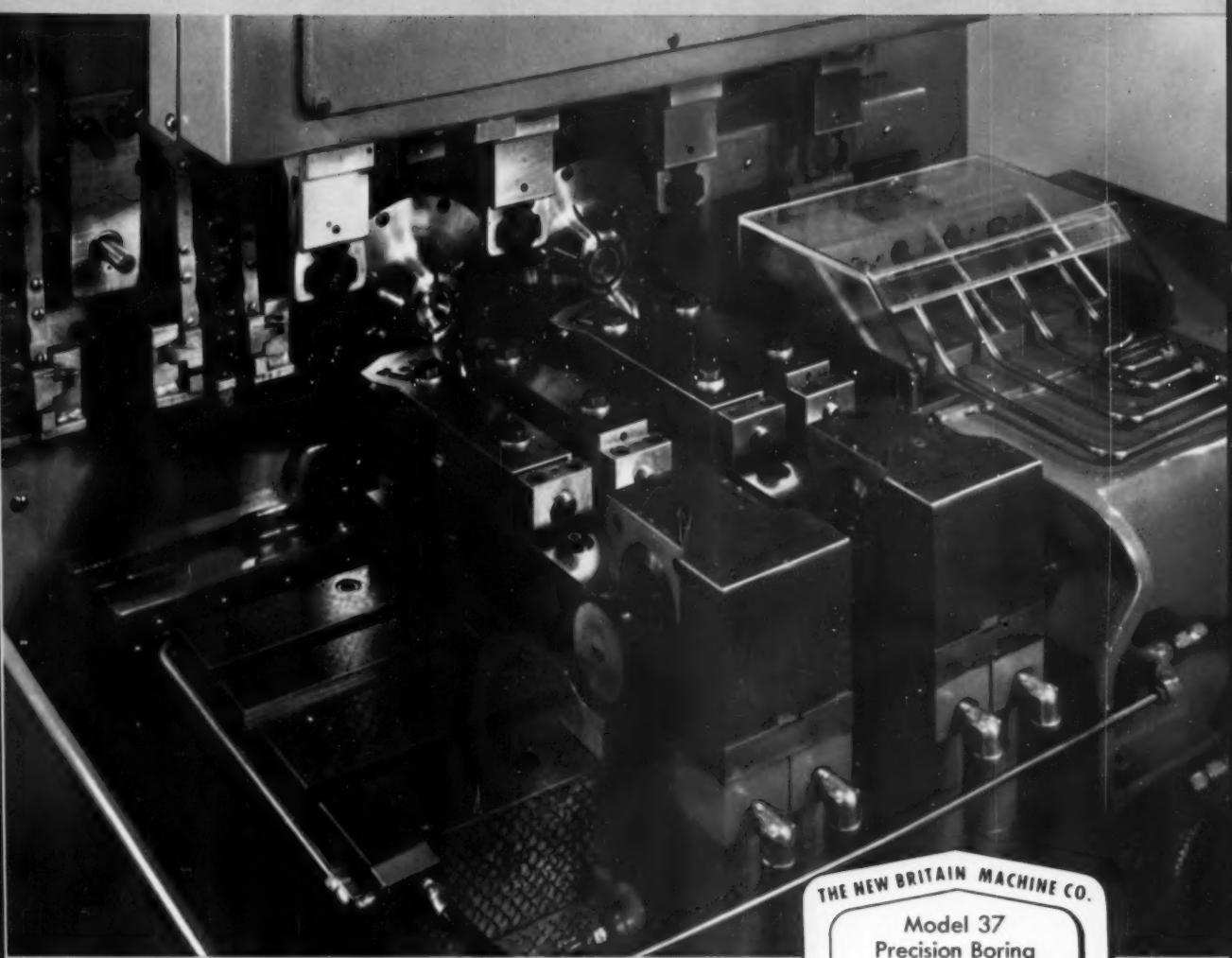
Builders of "SHAW-BOX" and "LOAD LIFTER" Cranes, "BUDGIT" and "LOAD LIFTER" Hoists and other lifting specialties. Makers of "ASHCROFT" Gauges, "HANCOCK" Valves, "CONSOLIDATED" Safety and Relief Valves, "AMERICAN" and "AMERICAN-MICROSEN" Industrial Instruments, and Aircraft Products.

"Copper" comes in several volumes. Section one deals with history, occurrence, metallurgy, the elements and alloys. Section two, the other book presently available, covers compounds. Both are complete works by the publishers of the "Gmelin Handbook of Inorganic Chemistry and Related Sciences." Part A-1 has 190 graphs, 710 p.p.; A-2, 235 graphs, 755 p.p. They cost \$92.13 and \$101.98 respectively. The Gmelin Institute of Inorganic Chemistry, Dimitri R. Stein, American Representative, 1074 Washington Ave., Pelham Manor, N. Y.

"Public Relations for the Atomic Industry" is designed to assist public relations and advertising personnel in dealing with information problems relating to application of the atom. 178 p.p. \$3.00. Atomic Industrial Forum, 260 Madison Ave., New York 16.

"Steel and Iron Wrought Products—Supply and Logistics Handbook." Provides a working knowledge of fundamental steel metallurgy and manufacturing practices, covering such subjects as steelmaking, effect of the elements in steel, mechanical properties, heat treatment, size and section information for steel products, quality and commodity descriptions of steel products, and others. Accompanying this information is a comprehensive list of and descriptions of various steel products, qualities, and manufacturing practices which throughout the years have become established in the steel industry. 1953. 195 p.p. Catalog No. D7.6/2:8. \$1.25. Supt. of Documents, Govt. Printing Office, Wash. 25.

"Packaging of Steel Pipe Couplings (Standard and Line Couplings, Black or Galvanized)." A recorded voluntary recommendation of the trade which provides a simplified schedule of standard quantities per unit package for steel couplings, standard and line (black or galvanized). 1954. 8 p.p. Catalog No. C 41.20:254—54. 5 cents. Supt of Documents, Govt. Printing Office, Wash. 25.



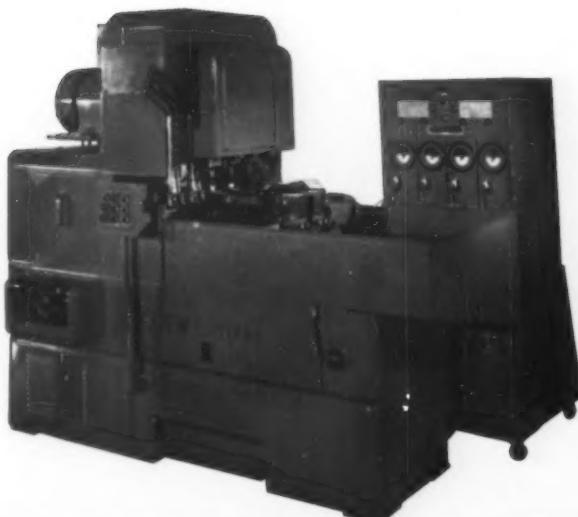
**this is  
the boring machine  
that thinks**

As successive pieces approach the limits of a  $\pm .00025$  inch tolerance, the tools reset themselves to size. With automatic loading, automatic gaging and two-at-a-time production, this and other New Britain Precision Boring Machines can cut costs for you. Please turn the page for more about New Britain Boring Machines.

THE NEW BRITAIN MACHINE CO.

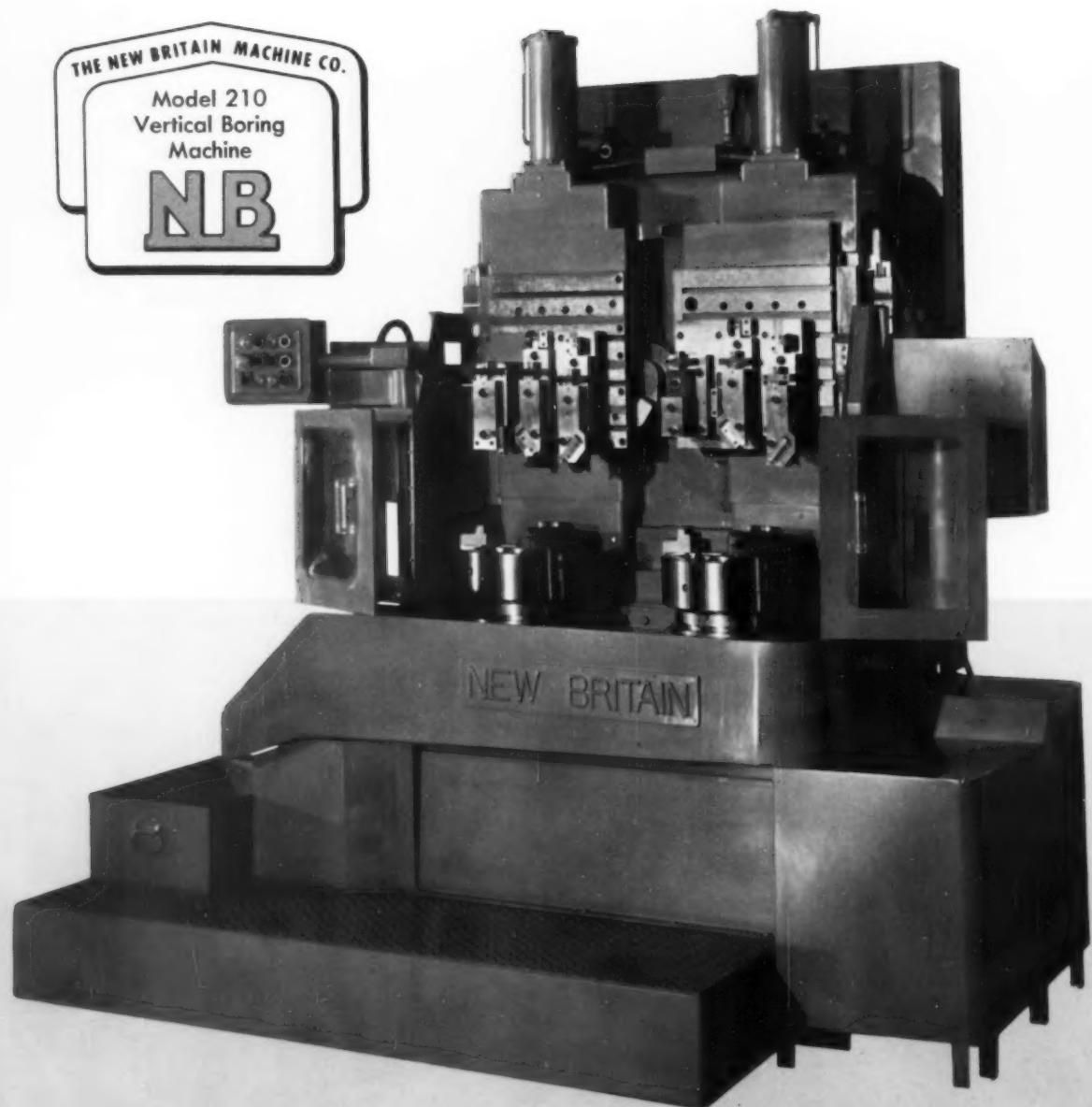
Model 37  
Precision Boring  
Machine

**NB**



**verticals  
too!**

New Britain builds a complete line of straight and contour boring machines, including double-end models, and this Vertical Precision Boring Machine for contouring and turning large parts to close tolerances. More and more the New Britain Sales Representative is your best bet for new and progressive metal-working methods. The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Connecticut.

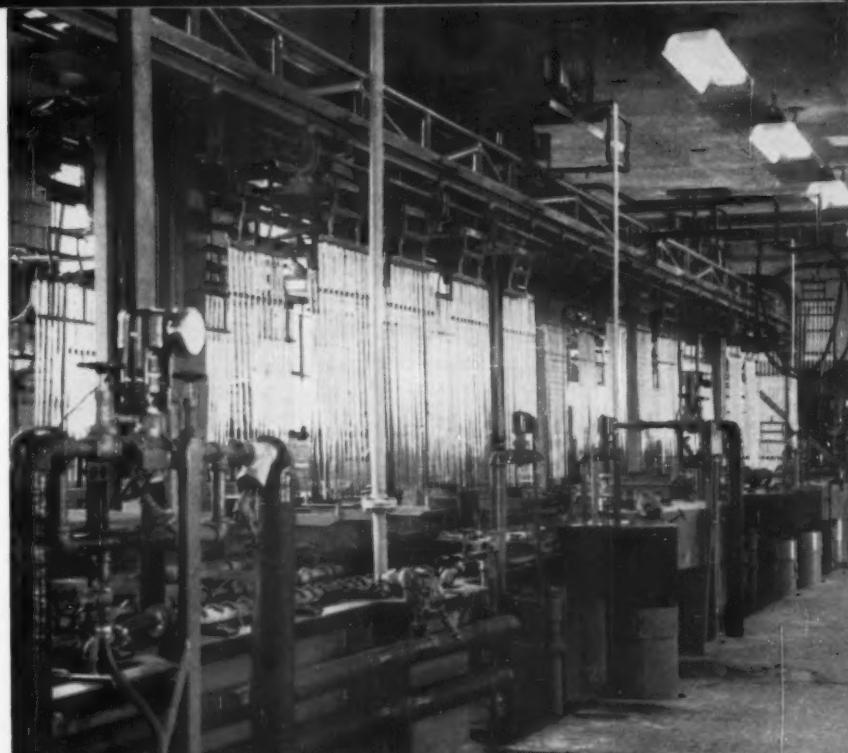


*"Engineering In History,"* written by engineers and historians working together, covers engineering development from about 6000 B.C. It shows how various factors in physical and cultural environments conditioned engineering advance and, conversely, how engineering has affected other human activities. Emphasis is on civil, electrical, and some metallurgical and mechanical engineering. A general introduction rather than a definite history, it should prove interesting to history-interested engineers. 530 pp. \$8.50. McGraw-Hill Co., Inc., 330 W. 42nd St., New York 36.

*"Chromium, Vol. I,"* written by 30 experts and edited by a well known research and development engineer, brings together latest accurate data on sources, properties, manufacture and use of metallic chromium, chromium alloys and chromium chemicals. (Vol. I covers chemistry; Vol. II, metallurgy.) Publishers believe it will prove "indispensable" to organic, inorganic and analytical chemists. 433 pp. \$11. Reinhold Publishing Corp., 430 Park Ave., New York 22.

*"Work Sampling,"* by Ralph M. Barnes, explains how sampling may be used for measuring work as well as for measuring delays of men and machines. The basic concepts are presented in simple form and then cases and specific applications are included as illustrations. There is also a report of research in work sampling conducted by Ralph M. Barnes at the University of California, as well as reports of research in this field conducted by others. \$5.75. 265 pp. Wm. C. Brown Co., 215 W. Ninth St., Dubuque, Iowa.

*"Mechanical Failures of Metals in Service,"* contains 35 cases of most frequently observed types of mechanical failures of metals in service. Design, fabrication and use contributing to failures, how to recognize them, and precautions are discussed. 36 pp. 30 cents. Catalog No. C 13.4: 550. Supt. of Documents, Govt. Printing Office, Wash. 25.



## PLATING 2000 GOLF SHAFTS AN HOUR ON THE UDYLITE FULL AUTOMATIC

### True Temper Profits with Plating Precision

Smooth operation of the Udylite Full Automatic machine has made the big difference in the nickel and chrome plating of golf shafts. The rejections due to plating defects are negligible as positive automatic action eliminated the constant hazards of hand operations.

The regulated speed of lift allows sufficient time for drainage resulting in saving some 50% of the plating solutions formerly lost—a considerable reduction in the use of nickel and chromic acid.

Plate deposit is controlled very closely—this equipment produces 2000 pieces per hour all with a fine degree of uniformity. The variable speeds of the machine itself permit True Temper to predetermine and maintain the plate deposit without changing the time or efficiency of the cleaning cycle.

These and many other unique advantages of Udylite engineering are shown in the new Full Automatic bulletin—write for your free copy.



WORLD'S LARGEST  
PLATING SUPPLIER

## FINISHING: Gun Applied Oxide Coatings

Oxide coatings are reported giving base metals considerable protection from excessive heat, abrasion . . . In the past they have been known to lack satisfactory adherence . . . However, special metallizing gun is said to solve this.

Considerable protection of underlying metals from abrasion and excessive heat is being attributed to some recently developed oxide coatings. Though they have been known in the past to lack satisfactory adherence to base metals, favorable reports now say that the coatings are being successfully applied with a special metallizing gun.

Previously a powder, the coatings presently are being developed in rod form. The new oxy-acetylene gun reduces the rod to molten particles at temperatures over 5000°F. These are projected at

### WANT MORE DATA?

*You may secure additional information on any item briefed in this section by using the reply card on page 113. Just indicate the page on which it appears. Be sure to note exactly the information wanted.*

high velocity by compressed air onto the surface to be coated. Grit blasting roughens the metal prior to coating.

### Porous In Structure

The oxide coatings, called Rock-

ide, are products of the Norton Co. while the gun is being made by the Metallizing Co. of America, Chicago.

By its nature the coatings are slightly porous in structure. In turn, its makers, say it shows "surprising flexibility."

One of the keys to successful spraying was design of a gun that feeds the rod at a sufficiently slow, uniform speed to permit the rod to reach proper flame temperature for proper atomization be-



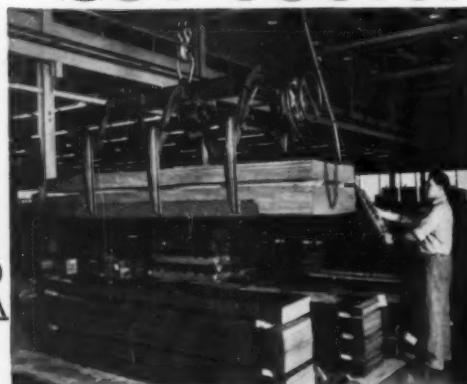
Operator applies oxide coatings with new metallizing gun.

## One Sure Way to CUT COSTS!

use a  
C-F  
SHEET  
LIFTER

The A. B. Dick Company, Niles, Illinois, found that this C-F Lifter has substantially reduced man hours and crane time required to move stock in and out of storage.

Up to 10,000 lbs. of high grade sheets in varying widths may be picked up, carried and unloaded at shears or machines with speed and



economy by the Lifter and its operator.

C-F Lifters are made in standard or semi-special models to handle from 2 to 60 tons. Bulletin SL-25 describes the advantages you can obtain from C-F Lifters. Write for it today.

**CULLEN-FRIESTEDT CO.**

1303 South Kilbourn Avenue • Chicago 23, Illinois



fore spraying. An electric drive provides an accurate, steady speed while feeding the rod as low as three in. per minute. Current satisfactory operation however, is somewhat faster with good coverage at around six to seven per minute.

### Experiments Continue

Using one 24 in. standard rod of aluminum oxide,  $\frac{1}{8}$  in. in diam will cover approximately 20 or more sq in. 0.010 in. thick in six minutes. Experiments are continuing with larger sized rods which will afford about double that rate. Coating thickness is

usually between 0.005 and 0.050 in. although coatings of 0.100 in. have been successfully applied.

There are at present three Rokide coatings available in rod form for coating of metal in  $\frac{1}{8}$  and  $\frac{3}{16}$  in. diam sizes. These are: Rokide A, an aluminum oxide coating; Rokide ZS, a zircon rod which dissociates into zirconium oxide and silica in the oxy-acetylene flame; and Rokide Z, a time-stabilized zirconia rod.

## Forgings:

**Salt bath descales  
titanium forgings**

Titanium forgings as well as other formed parts are now being descaled through a molten-salt-bath process.

Well known throughout the steel mill industry and among metal fabricators generally, the process has been adapted by titanium producers, according to the process' designers, the Kolene Corp., Detroit.

### Low Metal Loss

Tests with the bath cleaned titanium aircraft forgings are reported to show that metal loss is reduced to an absolute minimum. There is no etching as a result of the bath. No hydrogen pickup is reported, even when immersed for long periods of time, says Kolene.

### Scale Completely Removed

The tenacious scale build-up on titanium forgings (common to many other hot-formed materials such as chrome nickel, chrome nickel stainless, Nimonic, etc.), is said to be completely removed in a brief treatment. Descaled after forming, the surface is then in proper condition for machining, and can easily be inspected. Thus, defective parts are located and scrapped before, not after, machining operations.

Parts such as aircraft turbine buckets and blades, which accumulate a heavy oily scale in service, are also being reconditioned through the process, says the company.



**COLUMBUS MCKINNON**

**CHAIN CORPORATION**

TONAWANDA, NEW YORK  
DISTRICT OFFICES: NEW YORK • CHICAGO • CLEVELAND

In Canada: MCKINNON COLUMBUS CHAIN LIMITED, ST. CATHARINES, ONTARIO

HERC-ALLOY® HAMMERLOK®



# 44 Kinnear Steel Rolling Doors

Speed Service at S & W Fine Foods —



The huge new San Francisco warehouse of S & W Fine Foods, Inc., is a monument to functional efficiency. And here are some of the ways in which 44 Kinnear Rolling Doors\* play an important part in this up-to-the-minute operation:

They open *straight upward* . . . coil smoothly out of the way *above the opening* . . . clear the *entire doorway* quickly — from jamb to jamb and from floor to lintel.

They stay *out of reach* of damage by wind or vehicles.

All floor and wall areas around the doorway are *always* fully usable.

Ceiling space around openings remains clear at *all times*. There's never any interference with cranes, hoists, conveyors, lighting, or other overhead equipment. Goods can be stacked "clear to the rafters" inside or outside the opening.

The tough, flexible, all-steel curtain of interlocking slats assures *long*

service, *low* maintenance costs, and *extra* protection against fire, wind, intrusion, and vandalism.

Heavy galvanizing—1.25 ounces of pure zinc per square foot of metal (ASTM Standards) — gives added resistance to weather, wear, and corrosion.

Kinnear Rolling Doors are built any size, for old or new buildings, with motor or manual control. Write for information, or for recommendations on your door needs.

\*33 Kinnear Steel Rolling Doors 18'9" wide by 10' high, ten doors 10' wide and 10' high, and one door 6' wide by 7' high.

## The KINNEAR Mfg. Co.

FACTORIES:

1760-80 Fields Ave., Columbus, Ohio  
1742 Yosemite Ave., San Francisco 24, Calif.  
Offices and Agents in All Principal Cities

**KINNEAR**  
ROLLING DOORS



## Finishing

GE announces germanium plating rectifier

A new air-cooled germanium plating rectifier incorporates automatic voltage stabilization and remote stepless reactor control.

The packaged equipment was made possible by a new, unified concept in rectifier design. The new design is the result of joint efforts by General Electric's Rectifier Dept., Lynn, Mass., and its General Engineering Lab, Schenectady, N. Y.

### Reactor Controls Voltage

Output voltage is controlled by a reactor. This eliminates moving parts, and reduces maintenance cost and down time. Voltage is maintained automatically, regard-



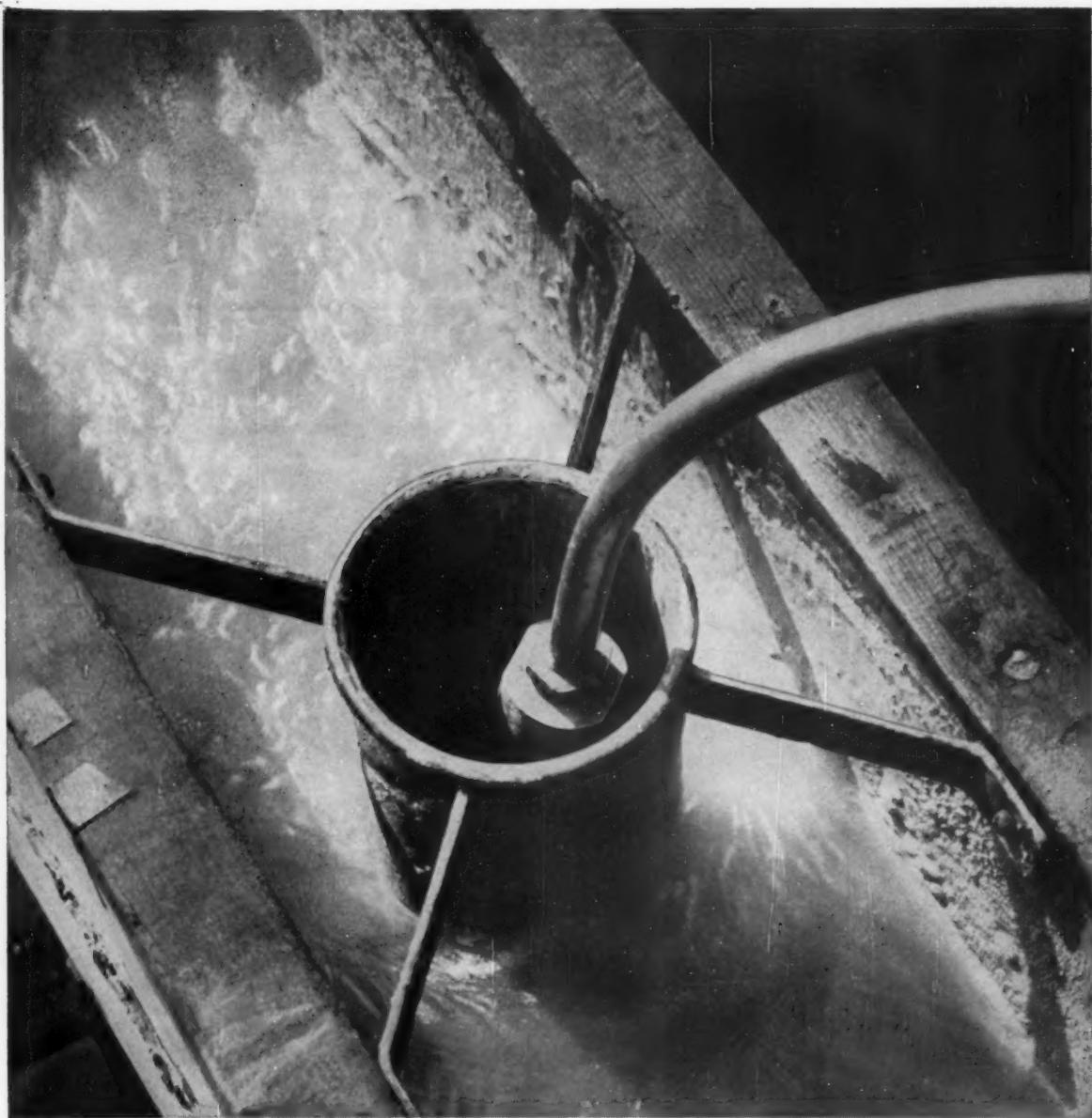
This "sunburst" is the heart of the cooling system.

less of changes in tank load or variations in ac line voltage. A special control to meet anodizing requirements can be used.

The remote control station can be placed conveniently near the tank, and the rectifier can then be installed at a favorable location from the standpoint of floor space, bus runs and corrosion protection.

Automatic voltage stabilization maintains correct voltages needed for today's closer plating tolerances, GE engineers say.

Heart of the reactor control system is a magnetic amplifier that signals the control reactor to make adjustment whenever actual voltage is different from the desired voltage set at the remote control station.



## This effluent is controlled at pH 7

...as it flows into a creek in northern Pennsylvania, from a large  $H_2SO_4$  plant. It always meets State "clean streams" requirements for industrial wastes because of its L&N pH Control System which includes Speedomax recorder, L&N Control Unit, Valve Drive Mechanism, and pH electrode assemblies like this flume-mounted unit.

The first step in applying this close control is L&N's pH Controllability Analysis. This unique appraisal of the process's controllability factors (type of waste, variations in flow and concentration, etc.) tells us whether your presently-installed treating process is actually controllable

within the limits you impose, and if not, what must be done to *make* it controllable. Then we translate these data into the answers you need to engineer an efficient treatment system.

Process Data Sheet 700(2), "L&N Speedomax Control of Plant Waste Disposal Processes," explains this unique and successful approach to waste treatment. Write Leeds & Northrup Company, 4956 Stenton Ave., Phila. 44, Penna.

**LEEDS**  **NORTHRUP**  
instruments      automatic controls • furnaces

## NEW EQUIPMENT

New and improved production ideas, equipment, services and methods described here offer production economies...for more data use the free postcard on page 113 or 114.



### Forging hammer strikes more blows per minute

This piston-lift gravity drop forging hammer reportedly permits more blows per minute with more precise stroke control than ever before achieved. The all steel air operated hammer gives its operator complete control of stroke variation. This allows selection from the full stroke range between the conventional short and long merely by varying pressure on hammer's treadle. A new arrangement provides 40 pct more guiding surface on the ram. Company reports this enables great guiding accuracy and constant maintenance of die ad-

justment. Guide ram adjustments are easily made from hammer's front and back at close to floor level. Thus, ram can be removed from hammer at die level without jacking. It is designed for forge shop safety. No loose linkage, no overhanging parts are reported. A cushion head affords protection if hammer is overstroked. Other easy-operation features: built-in inching mechanism for die setups, better clamping system. Hammer is available in 1500 to 5000 lb sizes. *Erie Foundry Co.*

For more data circle No. 30 on postcard, p. 113

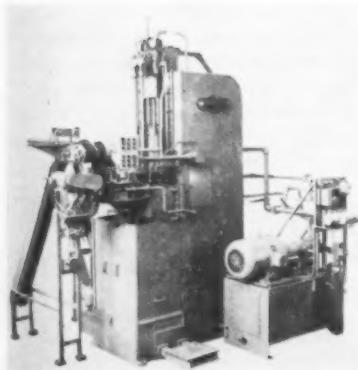


### Mobile dispenser transports coolants, oils swiftly

Transporting and dispensing coolants, hydraulic and cutting oils or solvents is swiftly accomplished by one man without spillage with this new mobile dispenser. The tank unit, mounted on 12 in. rubber tire or 30 in. steel wheels, has a capacity of 80 gal. It is available with hand or electrically operated 15 gpm pumps. One or two way pumps may be specified on all models. Electric model is also available with valving which permits mixing liquids with-

in the tank. Stainless tanks, larger capacities or multiple compartment tanks are also available. Hand operated model can be equipped with gallon stroke or diaphragm pumps. Gasoline powered or air motor driven pumps can replace the electric pump. Anti-splash baffles within tank contribute to handling ease and provide reinforcement. Dispenser is recommended for narrow aisles. *Coolant Equipment Corp.*

For more data circle No. 31 on postcard, p. 113



### Internal pull-down broaching machine is flexible

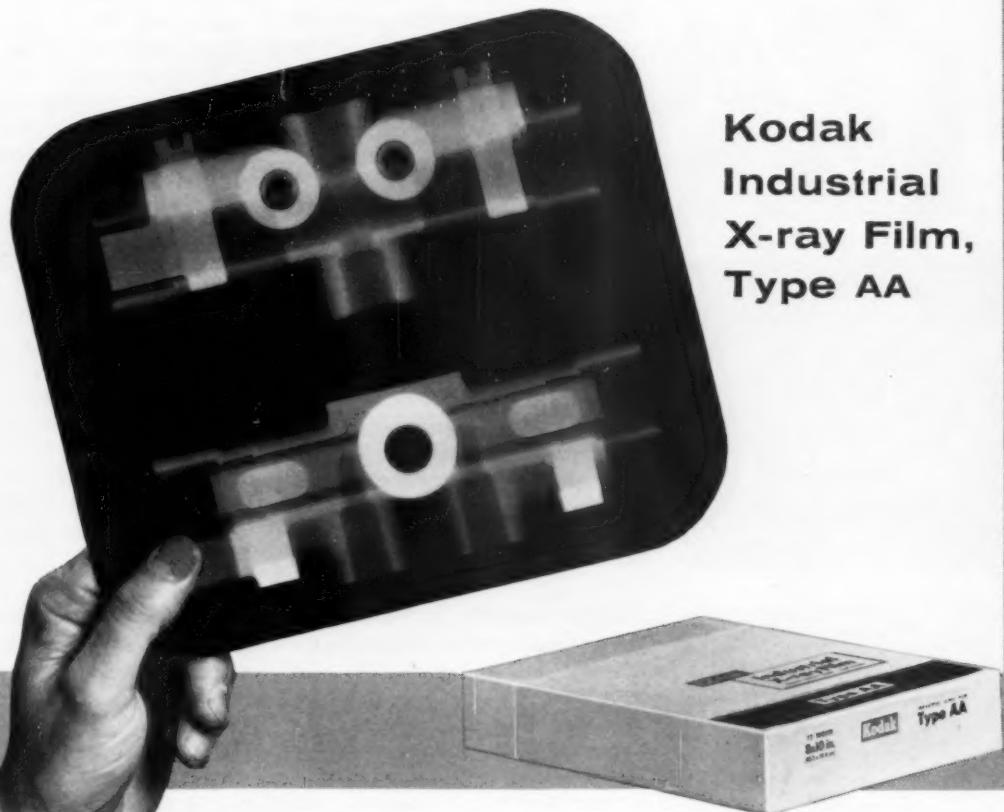
Tooling flexibility and easy maintenance are key features of this pull-down machine for vertical, internal broaching applications. It is completely electrically controlled. All components are interlocked to provide continuous automatic operation. For better maintenance accessibility, hydraulic systems are self-contained and are located outside the machine column. Unobstructed face of the heavy duty column allows wide tooling adap-

tion. Generous-size work table provides rigid support with minimum deflection for simple tooling as well as for the dial index type unit. New hinged splash guards under the table open to give clear access to broach puller assembly and coolant sump. It can be toolled with new radically locked pullers, hydraulically actuated and electrically interlocked to the machine cycle. *American Broach & Machine Co.*

For more data circle No. 32 on postcard, p. 113

# New X-ray Film

gives greater detail with usual exposure times



**Kodak  
Industrial  
X-ray Film,  
Type AA**

**Read what the new Kodak  
Industrial X-ray Film,  
Type AA, will do for you.**

- Reduces exposure time—speeds up routine examinations.
- Provides increased radiographic sensitivity through higher densities with established exposure and processing techniques.
- Gives greater subject contrast, more detail and easier readability when established exposure times are used with reduced kilovoltage.
- Shortens processing cycle with existing exposure techniques.
- Reduces the possibility of pressure desensitization under shop conditions of use.

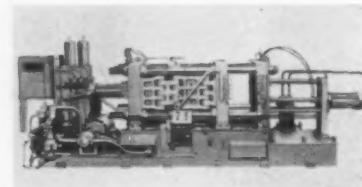
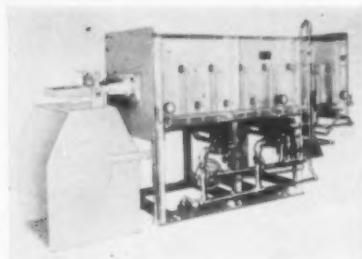
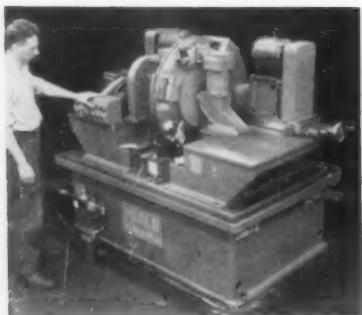
Now your x-ray dealer can supply you with this new x-ray film that gives you greatly increased speed. This gives you the opportunity of using reduced kilovoltage to obtain greater radiographic contrast, and easier readability with established exposure times.

And in addition to ranging up to more than double the speed, this new film retains the fine sensitivity characteristics which have made Kodak Type A the most widely used x-ray film in industry.

Kodak Industrial X-ray Film, Type AA, will save you time. It can produce finer work. Get in touch with your x-ray dealer or Kodak Technical Representative and see how.

**EASTMAN KODAK COMPANY  
X-ray Division  
Rochester 4, N. Y.**

**Kodak**  
TRADEMARK



### Automatic stud driver is easily adaptable to three heads

Demands for a smaller version of one company's six head and 12 head automatic stud drivers were so great, the firm says, that it pushed production of this new machine. The new unit is easily adaptable to from one to three heads. They can be promptly changed to a new pattern, using new spacer bars from factory drawings. Since heads can be spaced as closely as  $2\frac{1}{2}$  in. center to center, they are easily integrated into automated index tables or conveyor lines. Heads are individually driven by  $\frac{1}{2}$  hp motors

(ac, dc or air torque) and are fitted with air-draulic or hydraulic connections. Units are equipped with JIC type electrical cabinet, vibratory four truck stud hopper, and either air-draulic or self-contained electric - hydraulic unit. Self-opening chucks, which are positive in drive, grip and release the studs without screwing out the driven studs. Close spacing of heads allow integration into conveyor, according to the manufacturer. *Syracuse Special Machine Co.*

For more data circle No. 33 on postcard, p. 113

### Precision parts are produced at rate of 270 per hr

Production speed and precision are reported for this machine that faces automatic transmission parts. Its production rate is 270 parts per hour at 75 pct efficiency. A constantly rotating trunion type fixture moves parts in a circular bath between and at right angles to two boring heads. These are in opposed positions. Two valve bodies clamped on either side of the fixture are

faced simultaneously. The 12-station fixture rotates at approximately  $\frac{1}{2}$  rpm producing two finished parts every 20 seconds. Tooling consists of two multiple holders each carrying eight single point carbide facing tools. Boring heads to which tool holders are fastened are slide mounted for tool change or stock adjustment. *Heald Machine Co.*

For more data circle No. 34 on postcard, p. 113

### Shaker hearth furnace has a new type hearth movement

A new type of hearth movement for a shaker hearth furnace has been introduced by American Gas Furnace Co. Designed especially for handling small workpieces, its object is to distribute the work evenly over the hearth, assure agitation of the work on the belt. Forward workpiece movement differs

from conventional shaker hearths in that the kinetic energy of moving workpieces carries them along the hearth. The hearth is moved forward rather fast and backward rather slowly to secure this action. A shock absorbing feature cuts noise. *American Gas Furnace Co.*

For more data circle No. 35 on postcard, p. 113

### Wire flattening mill boasts most advanced design

Manufacturer has announced a new three stand tandem wire flattening mill. It is said to incorporate the most advanced rolling mill features. It has a common base, central coolant and lubrication systems. The latter is fully pressurized to all roll bearings and pinion stand gears. First mill stand has

eight in. diam rolls; the second and third mill stands have six in. diam rolls with power screw down. A synchronized drive provides speeds up to 1000 fpm. It features shell rolls for rolling a shape other than square or rectangular and a slitter-trimmer. *Fenn Mfg. Co.*

For more data circle No. 36 on postcard, p. 113

### Many features reported for die casting machine

Many new features are reported for a new 600-ton die casting machine. It is said to afford easy operation and little maintenance. Locking pressure is strain gage tested. It will lock dies securely and produce

castings with a minimum of flash. Net weight of the hot chamber machine is 42,500 lb. Cold chamber machine's net weight is 35,500 lb. *Cleveland Automatic Machine Co.*

For more data circle No. 37 on postcard, p. 113

# Johns-Manville organizes to give you better insulation service

*New and separate insulations division created to  
provide industry greatly improved Sales and  
Engineering service to meet modern problems*

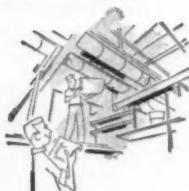
- Johns-Manville is now concentrating all industrial insulation operations within a new, fully integrated insulations division. This greater specialization makes possible the most complete insulation service available to industry. It consists of—



As co-ordinator of J-M's extensive research-engineering-manufacturing facilities, he offers you outstanding insulation training and experience.



proper finishes, weatherproofing and securement. His highly specialized knowledge makes possible an intelligent recognition and handling of your individual insulation requirements.



estimators and mechanics trained in J-M application techniques. He is ready to give you fast, efficient service on any insulation job—large or small. Proud of his reputation for integrity in his own community, the J-M Insulation Contractor merits your complete confidence.

**Insulation Contract Units . . .**  
Fully aware that no insulation is better than the man who applies it, the J-M Insulation Contractor makes care and skill in the scientific application of Johns-Manville insulations his stock in trade. He maintains a complete crew of



**Complete Range of Products—**  
In this day of exacting temperature control, the need for specific insulations for specific services is greater than ever before. Recognizing this, Johns-Manville manufactures insulations for every industrial requirement. Produced

from the finest grades of asbestos, magnesium carbonate, diatomaceous silica, refractory clays and ceramic fibers, they are designed to afford maximum insulating effectiveness and durability at operating temperatures ranging from minus 300F to plus 3000F.



**Extensive Research Facilities—**  
At Manville, New Jersey, Johns-Manville maintains the world's most completely equipped insulation laboratory. Here insulation scientists are engaged in a continuous program of developing new and better insulating ma-

terials. In addition, their technical knowledge is always available to J-M customers whose insulation problems require special study.



**Experienced Management—**  
At headquarters as well as in the field, management of the new insulations division consists of men who, in line with J-M's promotion-from-within policy, are insulation veterans. With a realistic grasp of customers' needs, they are alert to new and better ways to serve you . . . now, and in the future.

**On Your Next Insulation Job—**Whether your next insulation job is big or little, simple or complex, let Johns-Manville handle it for you. Just call your nearest J-M sales office, or write direct to Johns-Manville, Box 14, New York 16, New York. In Canada, Port Credit, Ontario. *Chances are, you'll be glad you did!*



**Johns-Manville** *first-in* **INSULATION**  
MATERIALS • ENGINEERING • APPLICATION

This tube support is 21 $\frac{1}{2}$ " long; 6 $\frac{1}{2}$ " wide and weighs 8900 pounds. It looks like a single casting. Actually it is made up of three sections welded together in zig-zag strips across the face. It's a Duraloy HH casting designed for an oil refinery cracking still.

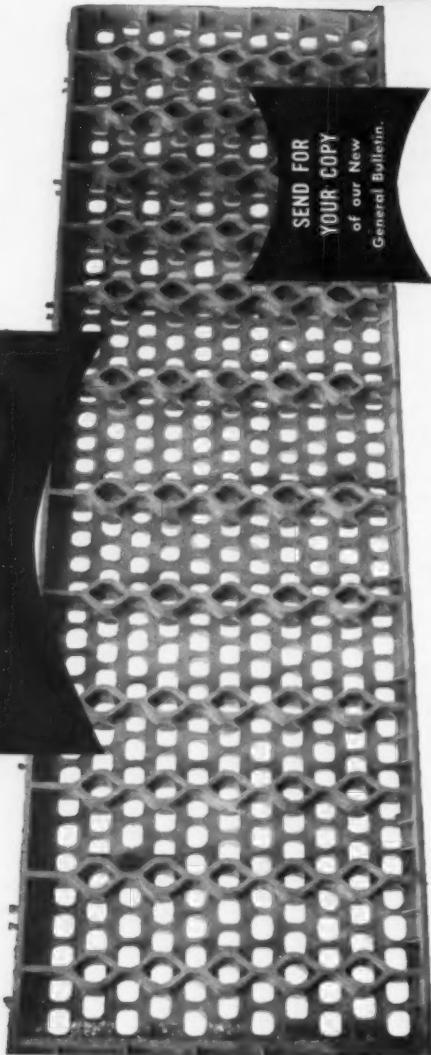
Welding is assuming greater and greater importance in the production of high alloy castings. Often it is the only way to produce large tonnage or unusually shaped pieces. During our many years of experience in producing both high alloy static and centrifugal castings, we have developed sound welding techniques for such castings. Carbon steel welding techniques won't serve. It takes special know-how for chrome-iron and chrome-nickel.

You can rest assured that if the chrome-iron or chrome-nickel castings you order from us require any welding, it will be done skillfully.

A good example of our  
**WELDING  
TECHNIQUE**



**in connection  
with high  
alloy casting**



**NEW EQUIPMENT**

**Eighteen station machine**

Forty-seven distinct operations are performed automatically on one-cylinder or two-cylinder refrigeration compressor housings by a new high production machine. This 18-station unit utilizes an 84-in. diam table to process 120 parts per hr. It is said to eliminate model change-over problems by incorporating standard production units. These are mounted on a basic center col-



umn machine equipped with an 18-station hydraulic indexing table. Unit-type construction permits fast, easy re-alignment for product model changes, completely new models, or other types of products within the machine's size limits. Adaptation is said to be possible for almost any product requiring mass production multiple drilling. *Morris Machine Tool Co.*

For more data circle No. 38 on postcard, p. 113

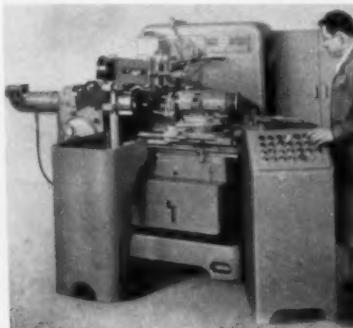
**New diamond blade**

Designed for ultra-high production cutting of highly vitrified masonry materials, this completely new ready-cut diamond blade features a 3/16 in. deep diamond rim. Considerably longer blade life is reported as compared with diamond blades that have the normal 1/8 in. diamond depth rim. In addition to longer life, the blade is described as offering added smoothness and increased speed on all highly vitrified masonry units. According to the manufacturer the diamond blade was added to their line only after many months of research and exhaustive field tests. *Eveready Brik Saw Co.*

For more data circle No. 39 on postcard, p. 113

### Automatic loader

Spur or helical internal gears on shaving machines are handled with a new fully automatic loading device. It is said to solve a difficult automatic loader design problem: that of meshing the teeth in an internal gear with those of the helical gear-shaped shaving cutter. An intermediate air-powered loading sleeve mechanism relieves the internal gears one at a time from a

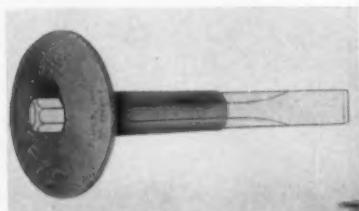


magazine feed. It hangs them on the cutter and provides the meshing problem solution. The loader can be installed on the company's internal shaving machines. The loader handles a 75 tooth, 20 pitch, four in. pitch diam, 20° pressure angle, 18½° helix angle internal gear at a rate of 70 gears per hour. *National Broach & Machine Co.*

For more data circle No. 40 on postcard, p. 113

### Tool safety device

Designed to eliminate bruised and broken fingers occurring in hand tool operations, a lightweight plastic hand guard fits tightly over tool stock. Plastic top deflects any hammer blow that does not strike the

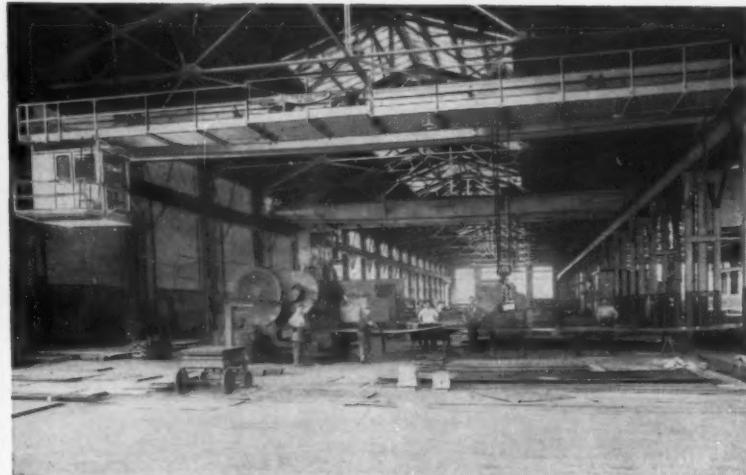


tool solidly. It also promises greater accuracy by presenting a clearer "target" for the hand tool users. This, it is believed, will increase production efficiency. *Tamco, Inc.*

For more data circle No. 41 on postcard, p. 113

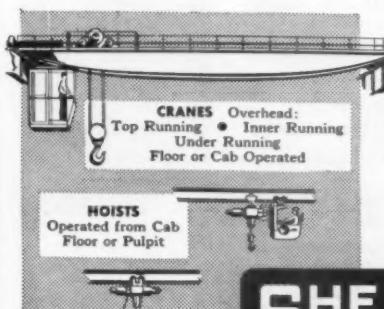
## SHEPARD NILES

# INDUSTRIAL CRANES in medium capacities



**TALK TO SHEPARD** Niles first when you're considering a medium capacity crane. Because Shepard offers a wide range of standardized cranes for your selection . . . including welded plate girders for longer spans; Shepard's widely-praised welded I beam design for shorter spans; geared or direct drive trucks; Shepard's distinctive crane trolley (not hoist type); cab or floor operated; manual or magnetic control.

These Shepard Niles Cranes can be rated and applied for light, medium or heavy service. All component parts are designed and built by us expressly for crane service.



• Write for Bulletin illustrating Shepard Niles medium capacity cranes . . . ask to have a representative call at your convenience.

**America's Most Complete Line  
of Cranes and Hoists  
Since 1903**

**SHEPARD NILES**  
CRANE AND HOIST CORPORATION

1485 Schuyler Ave., Montour Falls, N.Y.

## NEW EQUIPMENT

# NON-FLUID OIL

TRADE MARK REGISTERED

## GIVES CONSTANT PROTECTION TO ANTI-FRICTION BEARINGS

When NON-FLUID OIL enters a bearing, it instantly forms a tenacious film, assuring positive protection against frictional wear, pitting, rust and corrosion.

At high or low speed, NON-FLUID OIL lubricated bearings run cooler and smoother, without drip or spatter. They require lubrication only one-third as frequently as with ordinary greases—which leave gummy, acid forming residues, causing heating and pitting.

Send for your free testing sample today. A copy of our bulletin on bearing lubrication and maintenance will also be sent . . . no obligation, of course.

### NEW YORK & NEW JERSEY LUBRICANT COMPANY

292 MADISON AVE., NEW YORK 17, N.Y.

WORKS: NEWARK, N.J.



WAREHOUSES  
Birmingham, Ala. Greenville, S.C.  
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Charlotte, N.C. Springfield, Mass.

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Detroit, Mich.  
Providence, R.I.  
St. Louis, Mo.

NON-FLUID OIL is not the name of a general class of lubricants, but is a specific product of our manufacture.

## Hendrick Adds Class to Living Rooms and → Locker Rooms →

More and more designers are including Hendrick Perforated Metal in the fabrication of new products. Typical of these is one company who manufactures the attractive room divider shown above using Hendrick Perforated Metal Square Link design. Another manufacturer installs an attractive Hendrick Ornamental Metal Grille on linen closet and locker doors.

And there are thousands of other applications where Hendrick Perforated Metal has added to product style and functionalism. For information on the type of perforated metal or grille best suited to your needs, call Hendrick today.



# Hendrick

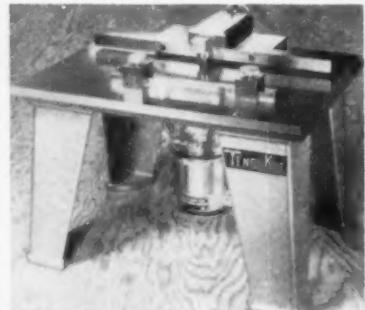
MANUFACTURING COMPANY  
37 DUNDAFF ST., CARBONDALE, PA.

Sales Offices in Principal Cities

Perforated Metal • Perforated Metal Screens • Wedge-Slot and Hendrick Wedge-Wire Screens • Architectural Grilles • Mitco Open Steel Flooring • Shur-Site Treads • Armogrids • Hendrick Hydro Dehazer

## Sheet, plate tester

Increased power and capacity is available on a new portable unit for machining tensile specimens from sheet and plate materials. Specimens 0.0005 to 0.5000 in. thick can be accurately machined to ASTM specifications from ferrous and nonferrous metals and plastics in less than three minutes, manufacturer says. Excellent results are

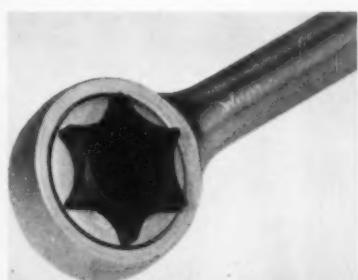


reported on light gage titanium and super alloys to 0.062 in. New model with increased controlled power produces undistorted edges with no measurable amount of cold working, and with no evolution of heat. Precision master template controls tolerances to a consistent  $\pm 0.0005$  in. *Sieburg Industries, Inc.*

For more data circle No. 42 on postcard, p. 113

## Ratchet wrench reverse

Shaped like a six pointed star, a new type ratchet wrench reverse mechanism can be operated with one finger. Older methods, of course, required two hands. Finger-



tip operation makes possible fast wrench reversing. It is unnecessary to release grip on wrench to operate the mechanism. It comes in black oxide on a polished chrome ratchet head. *Wright Tool & Forge Co.*

For more data circle No. 43 on postcard, p. 113

### Big bearings

Rugged mill bearing for 11 in. diam shaft is largest in company's complete new line of catalogued heavy duty mill bearings. Smallest bearing in the line for shaft diameters

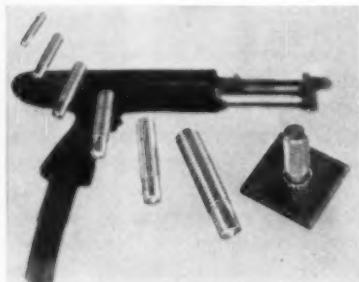


of 2 7/16 in. provides a sharp product contrast. Especially designed for severe operating conditions found in mining and mill operations, the 11 in. bearings have self-aligning roller bearings and rugged steel housings. *Link-Belt Co.*

For more data circle No. 44 on postcard, p. 113

### Stud welding

New type threaded end welding stud is said to offer important design improvements and cost less than the standard product. The granular-fluxed studs have tensile



strength as much as 13 pct greater than former studs and provide improved welding qualities. Same templates now being used with firm's studs can be used. *Nelson Stud Welding Div., Gregory Industries, Inc.*

For more data circle No. 45 on postcard, p. 113



## dial ATLAS for corrosion control

Help in solving your corrosion problem is as near as your phone . . . and the number is listed below. Atlas, with a quarter century of experience in solving corrosion problems, helps over 3,000 plants each year to reduce lost time and money caused by corrosion. Atlas is familiar with all types of corrosion problems, from coating small items of plant equipment to the construction of the largest continuous picklers.

Our facilities are geared to help you with on-the-spot technical advice, engineering and design assistance, highest quality corrosion proof materials and construction services to carry the job from beginning to end.

A phone call will bring an Atlas technical representative . . . a letter will bring literature on the complete line of corrosion proof cements, protective coatings, tank linings, rigid plastic fabrications and rigid plastic piping.

Phone or write:

NEW YORK, N. Y. — 475 5th Ave.  
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Bldg. RI 6-0298  
PITTSBURGH, PA. — 4518 Brownsville Rd.  
TUXedo 1-4720  
CINCINNATI, OHIO — 1814 Yorktown Rd.  
EL 1-4884  
DETROIT, MICH. — 2604 Oliver St., Royal  
Oak. LI 6-4870  
CHICAGO, ILL. — 333 N. Michigan Ave.  
FR 2-7100  
BIRMINGHAM, ALA. — 304-06 Brown Marx  
Bldg. 4-2581  
MEMPHIS, TENN. — 4711 Poplar Ave.  
MUtual 5-5001

KANSAS CITY, MO. — 1412 W. 47th St.  
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HUNter 4-1662  
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TH 3-6826  
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MERTZTOWN, PENNSYLVANIA

## NEW EQUIPMENT



**"BEST \$1306 WE EVER SPENT!"**

**That's the price of this 5-Ton HANNIFIN Press\***

A lot of production men have made such comments about this versatile little hydraulic press.

They like the way you can adjust it to the exact force you need for each job, all the way from 1 ton to 5 tons. The backstroke is adjustable, too, so the ram just clears the work on any job. Fast-acting controls. Prompt delivery from stock.

**WRITE.** Complete information and prices on the Hannifin line of 1- to 10-ton Hydraulic Presses will be sent on request.

\*Price complete with motor and starter F.O.B. our press plant, St. Marys, Ohio, subject to change without notice.



# HANNIFIN

Hannifin Corporation, 513 S. Wolf Rd., Des Plaines, Ill.



FOR LESS THAN \$45 YOU GET 12 SETS, EACH SET GROUND READY TO GO

*Men would not accept either idea at first . . .*

### INSERT CHASERS SAVE UP TO 33%

Insert chasers are like safety razor blades: they cost so little that you can throw them away when dull. Or, for utmost economy, you can resharpen them over and over again. Only a flash grind is required. For less than \$45 you get a dozen sets of  $\frac{3}{4}$ -16 insert chasers, each set ground ready to go. You will be amazed at the quantity of threads they will cut, even to Class 3 specifications, with a minimum of downtime. FREE: "Selecting the Proper Die Head for the Job".

THE EASTERN MACHINE SCREW CORPORATION

21-42 Barclay St., New Haven, Conn.

One man can empty a standard 55-gallon drum with a new drum tilting mechanism. Lowered over a drum, it is ready to lift as soon as two load binders are tightened. When drum is lifted to the proper position, a light pull on a chain or a turn of a handwheel is sufficient to turn the drum for dumping or



pouring. It is particularly recommended for handling chemicals and solvents and will handle loads up to 750 lb. It is suitable for both disposable-type and returnable-type 55 gal drums. The drum can be rotated through a full  $360^\circ$  by a worm drive arrangement. Two locking devices are provided for safe operation. Heppenstall Co.

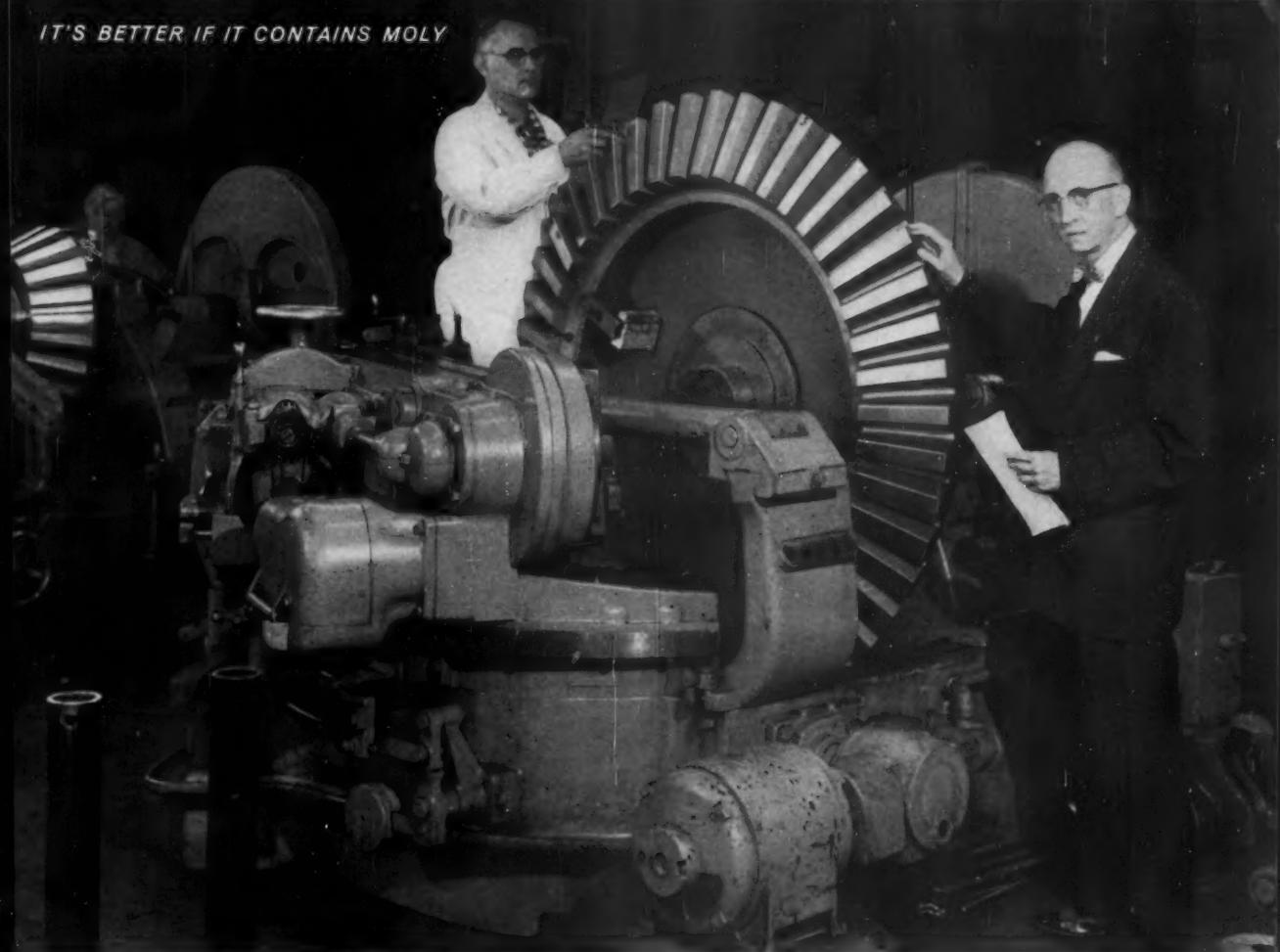
For more data circle No. 46 on postcard, p. 113

### Torque tester

Torque wrenches can be calibrated quickly with an accuracy within  $\frac{1}{2}$  pct on this tester, its developer reports. Ruggedness, reliability, and accuracy without moving parts are features of the electrical tester. It is based on the principle of the bonded resistance wire strain gage. Torque measuring consists of an electronic amplifier and an indicating instrument with rotating dial on which torque can be read in inch-pounds. Loads are applied on the handles of torque wrenches hydraulically through an adjustable fulcrum. Baldwin-Lima-Hamilton Corp.

For more data circle No. 47 on postcard, p. 113

IT'S BETTER IF IT CONTAINS MOLY



E. B. Smiley, Metallurgist for Illinois Gear & Machine Co., looks over setup of large, heavy duty bevel gear made from molybdenum

alloy steel casting. This gear has been rough turned, rough cut and heat treated to 269 to 302 Brinell before finish cutting.

## For Strength, Hardness and Machinability gear maker recommends Molybdenum Alloy Steels

**"All of our gears are made to customer specifications, and in many cases these include the use of molybdenum steels," says Mr. Smiley, metallurgist for Illinois Gear & Machine Co. "When our customers specify heat-treated gears of plain carbon steel," Mr. Smiley continues, "we often recommend that they change to 4140 alloy containing molybdenum to achieve high strength and hardenability with good machinability."**

Moly steels offer gear users many advantages over carbon steel. Their greater strength and toughness permit the use of smaller weight-saving gears to transmit a given amount of power. Reduced weight and size of gear housings and other components add to the economy of moly steels. And their higher endurance is an important safety factor.

The properties of moly steels are discussed in a new booklet "Moly Steels for Cast Gears". Full technical assistance is also yours for the asking. Write Climax Molybdenum Co., Dept. 2, New York 36, N. Y.

### CLIMAX MOLYBDENUM



## NEW EQUIPMENT

### Drafting board

Draftsman fatigue is said to be the major cause of engineering errors. A new drafting board is designed to reduce this. A vertical feature prevents dirt and dust collecting on drawings and eliminates smudging. A drafting machine rests on the drawing with feather touch. Board is available in two models. One has



We carry your inventory.  
Large stock for your convenience.  
Special tools to order.  
Quality and workmanship guaranteed.  
Prices on Application.  
Write Dept. B for New Catalog 54.

A circular graphic containing several tools. At the top, the words "PUNCHES \* DIES \* RIVET SETS \* COMPRESSION RIVETER" are written in a circular arc. Inside the circle, there are four distinct tools: a punch on the left, a die on the right, a riveter in the center, and a rivet set at the bottom. The tools are arranged in a radial pattern within the circle.

**GEO. F. MARCHANT COMPANY**  
1420-34 So. ROCKWELL STREET • CHICAGO 8, ILLINOIS

## ARMSTRONG *Drop Forged* LATHE DOGS



**ARMSTRONG**  
Lathe Dogs give extra service because they are drop forged from selected open hearth steel, and are heat treated to extreme toughness and stiffness. Hubs are made large enough to permit re-tapping, screws are also of special analysis steel and are hardened at the point to prevent upsetting. **ARMSTRONG** Dogs come in 10 types with square head or safety headless screws, with straight or bent tails. They are carried in stock by your local **ARMSTRONG** Distributor.

Write for Catalog

**ARMSTRONG BROS. TOOL CO.**  
5209 West Armstrong Ave., Chicago 30, Ill.  
New York and San Francisco



fixed board angle of 15° from vertical and the other adjustable through an arc of 85° from vertical. Both models have an up-and-down adjustment of 20 in., permitting draftsman to work, seated or standing, at optimum visual angle in a comfortable position on any area of the board without bending or stretching. *L.A.B. Corp.*

For more data circle No. 48 on postcard, p. 112

### Surface finishers

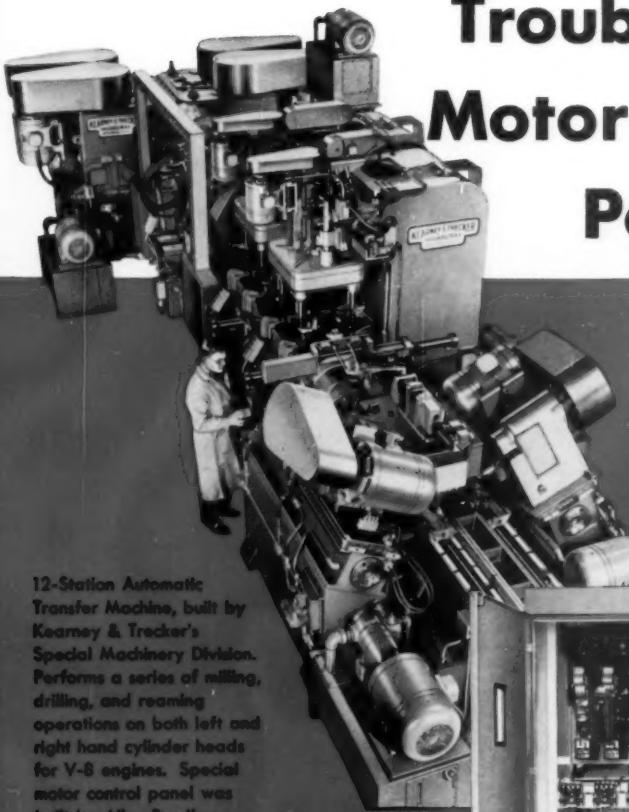
Significant reduction of floor space and time study motion are reported with a new series of surfacing machines. Motor brackets are said to be entirely different from all predecessors. Castings for the motors are rear-mounted. This removes overhanging motor weights from the main pivot shafts. As a result, increased buff float sensitivity for improved contouring is attained, company says. Motors' rear location has also reduced machine's overall width from 9 ft 4 in. to six ft without affecting the complete interchangeability of all components with the firm's old series. *Clair Mfg. Co., Inc.*

For more data circle No. 49 on postcard, p. 112

# Satisfied Customers

RESULT FROM THE USE OF

## Trouble Free Motor Control Panels

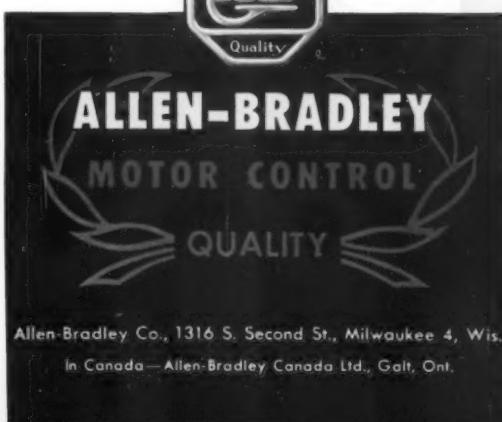
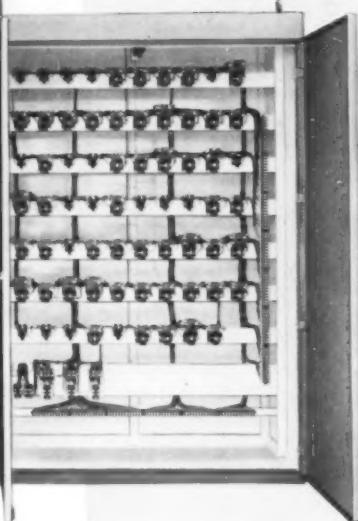


12-Station Automatic Transfer Machine, built by Keamey & Trecker's Special Machinery Division. Performs a series of milling, drilling, and reaming operations on both left and right hand cylinder heads for V-8 engines. Special motor control panel was built by Allen-Bradley.

You get two definite advantages when you let Allen-Bradley furnish your special control panels, namely—trouble free, continuous reliability plus ready customer acceptance.

Allen-Bradley control panels are built from standard components whose reliability and maintenance free operation have been proven in many years of service. Their simple design is your guarantee of millions of trouble free operations. The familiar A-B trademark—recognized universally as the sign of QUALITY—is a decided sales asset on your equipment.

Write for your copy of the Allen-Bradley Handy Catalog—the quick and easy reference guide that will help you select individual control units, or components for special control panels.



Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

In Canada—Allen-Bradley Canada Ltd., Galt, Ont.



Bulletin 849  
Pneumatic Timer



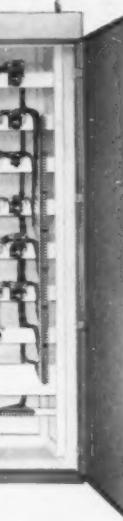
Bulletin 709  
Automatic Solenoid Starter



Bulletin 802T  
Oiltight Limit Switch



Bulletin 800T  
Oiltight Push Button

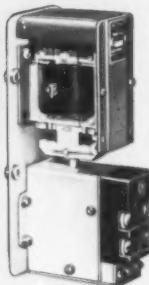


Bulletin 702  
Solenoid Contactor

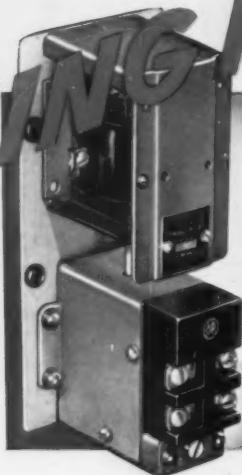


Bulletin 700  
Solenoid Relay

# TIMING RELAYS!



Bulletin 849 "On-Delay" timer. By inverting solenoid, timer is converted to "Off-Delay" operation.



Installing instantaneously operated contact block with one N.O. and one N.C. contact



## Timer Adjustment

The timing interval can be adjusted quickly and easily by turning the adjusting screw.

**Tell Us About YOUR TIMER NEEDS . . .**  
**Allen-Bradley Has the RIGHT ANSWER!**

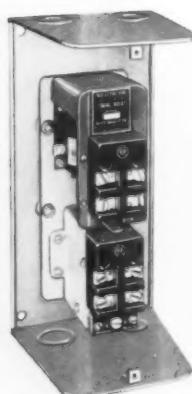
Here is a line of pneumatic timers that can be adjusted for a consistent time delay of 1/6 second up to 3 minutes. Air, drawn into the timer through a needle valve, is freed from dirt and dust down to submicroscopic size by a high efficiency glass fiber paper filter. Thus the time settings are accurately maintained over long periods. These timers can be expected to operate reliably under conditions of severe atmospheric contamination.

An outstanding feature of these timers is the wide variety of types available, and the modifications which can be made in the field, such as adding one or two instantaneously operated aux-

iliary contacts. Also, it is easy to change an "On-Delay" timer to the "Off-Delay" operation, or vice versa—by simply inverting the operating solenoid. The "On-Delay" timer provides the time delay after the magnetic operating COIL IS ENERGIZED; the "Off-Delay" timer provides the time delay after the operating COIL IS DE-ENERGIZED.

The Bulletin 849 timer has one normally open and one normally closed contact. As usual, the Allen-Bradley double break, silver alloy contacts are maintenance free. Auxiliary contacts can be mounted as shown below.

## A few typical Bulletin 849 Pneumatic Timer combinations



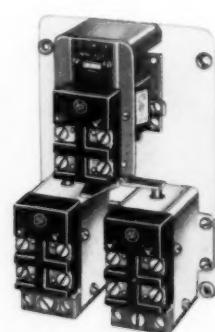
Bulletin 849 timer with one N.O. and one N.C. auxiliary contact.



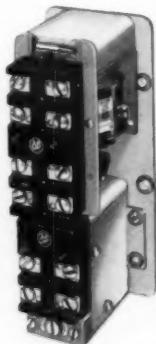
Bulletin 849 "Off-Delay" pneumatic timer with time delay after the coil is de-energized.



Bulletin 849 "Off-Delay" pneumatic timer with one N.O. and one N.C. auxiliary contact.



Bulletin 849 "On-Delay" pneumatic timer with two adjustable timing units.



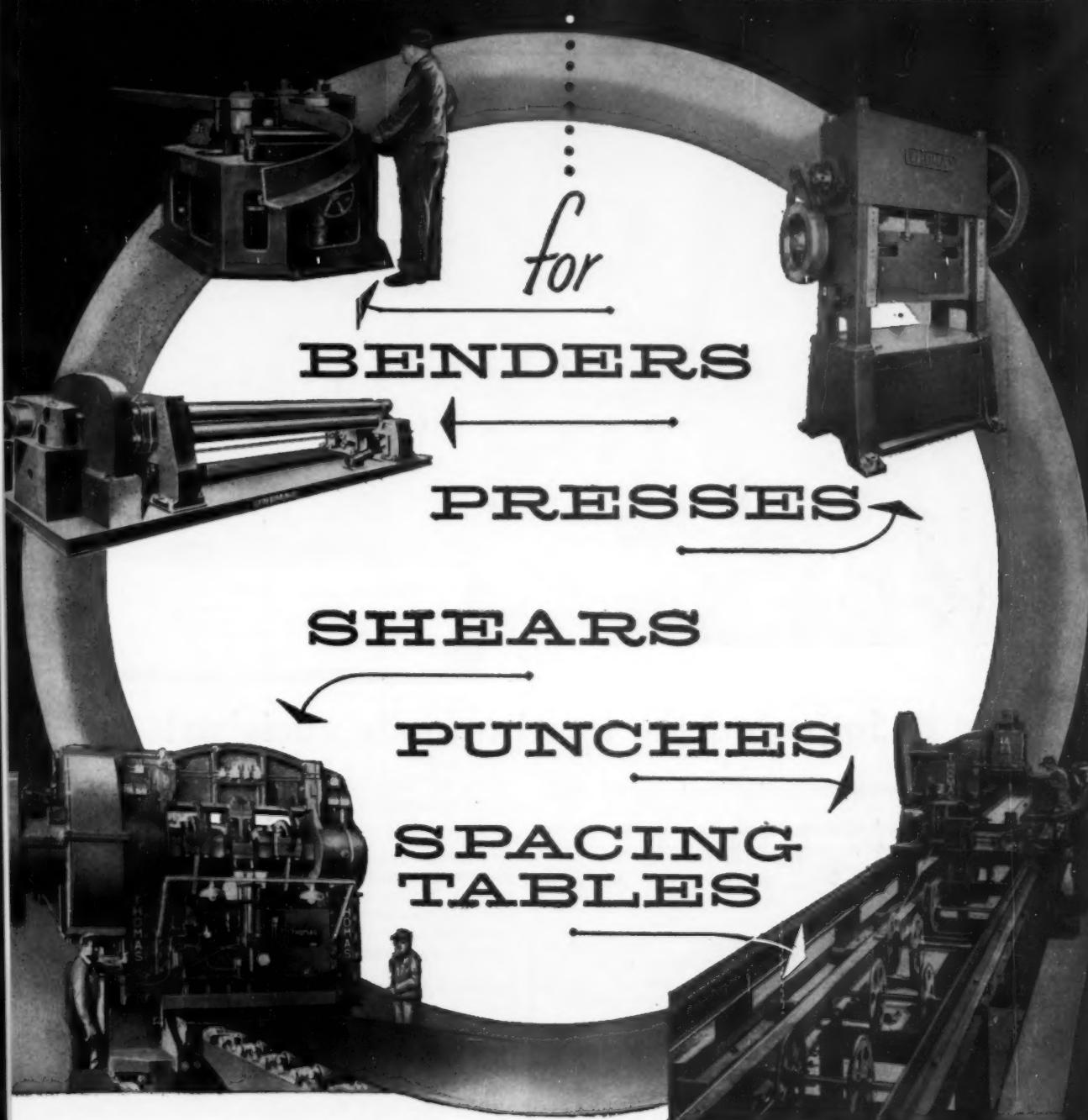
Bulletin 849 pneumatic timer with two N.O. and two N.C. auxiliary contacts.

Allen-Bradley Co.  
 1316 S. Second St.  
 Milwaukee 4, Wis.



In Canada—  
 Allen-Bradley Canada Ltd.  
 Galt, Ont.

# THE TREND IS TO THOMAS



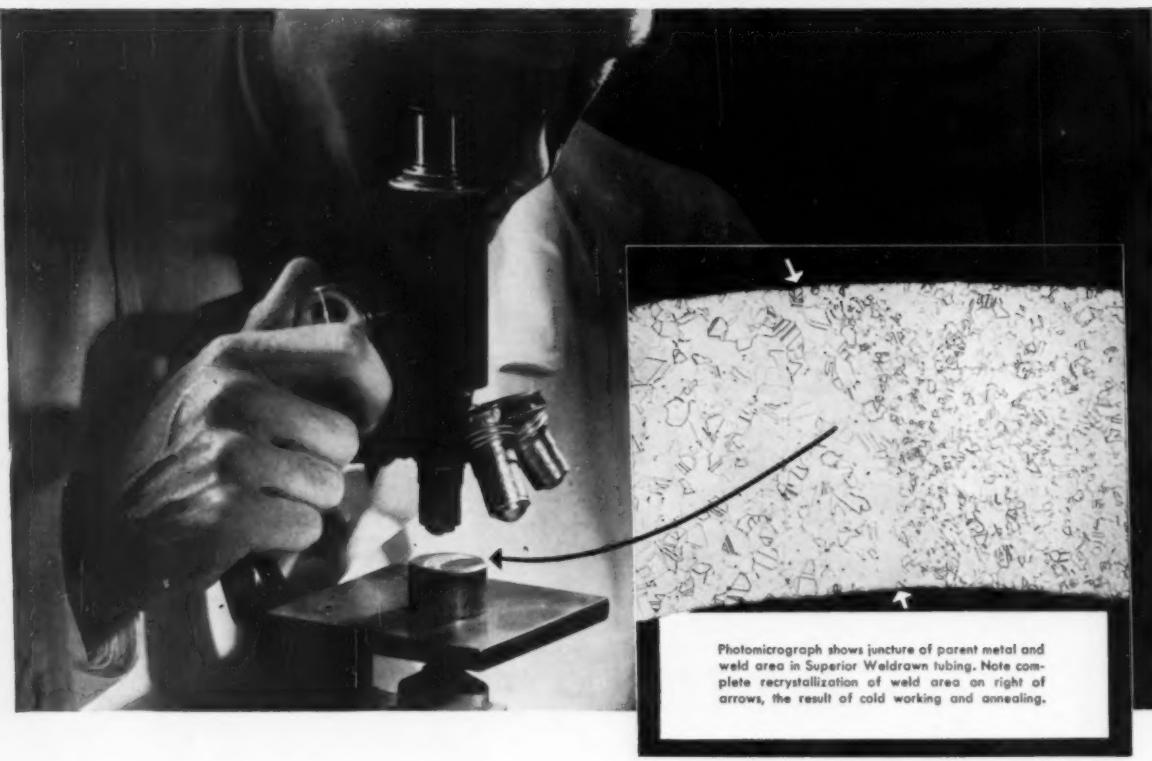
In steel mills, car shops, structural and bridge works, and general fabricating plants . . . there you will find Thomas machinery doing the job faster and better!

Every Thomas punch, spacing table, bender, shear or press is sturdily built for dependable performance, designed for production economy and available in various sizes and tonnages.

**THOMAS**  
MACHINE MANUFACTURING CO.

PITTSBURGH 23, PA.

# Weldrawn® Tubing by Superior



Photomicrograph shows juncture of parent metal and weld area in Superior Weldrawn tubing. Note complete recrystallization of weld area on right of arrows, the result of cold working and annealing.

## So perfect the bead actually vanishes!

### Here's how to cut tubing costs up to 50%

Specify Superior Weldrawn. You get quality approaching that of seamless, at savings as high as 50%! Unlike other welded tubing, Weldrawn is offered in *any* of the intermediate sizes—made possible because of the redrawing after welding.

#### "Weldrawn" Means—

This is a tubing far superior to ordinary welded tubing for many applications requiring forming, machining and corrosion resistance. After welding, it undergoes alternate cold drawing and annealing.

The weld area recrystallizes (see photo above), acquiring mechanical properties equivalent to those of the parent metal. The bead actually vanishes!

#### Costs Are Low

Weldrawn tubing is produced in 18 different analyses, in a wide

variety of sizes. Cost savings are 10 to 20%. In certain materials you save up to 50%!

#### Quality Is High

In Weldrawn you get tubing with highly uniform mechanical properties throughout, and clean, smooth, bright ID and OD surfaces. Because no filler or flux is used during welding, the corrosion resistance of the weld area is equal to that of the parent metal. And by repeated redrawing and annealing after welding, any possible faults or defects in the weld are eliminated.

#### Specify Superior

In addition to Weldrawn tubing, we also offer a wide variety of analyses and sizes in Seamless grade. So for the finest in small tubing, always specify Superior.

Whatever your problems in small tubing, Superior can help you. For additional information on Weldrawn, write for Data Memorandum No. 2. Superior Tube Company, 2004 Germantown Ave., Norristown, Pa.

**Superior Tube**  
The big name in small tubing  
NORRISTOWN, PA.

*All analyses available in .010 in. to 5/8 in. OD—certain analyses in light walls up to 2 1/4 in. OD*

West Coast: Pacific Tube Company, 5710 Smithway St., Los Angeles 22, Calif. • RAYmond 3-1331

## The Iron Age SUMMARY...

**Post-Labor Day bulge will tighten market to breaking point . . . Washington gets feelers on modified controls . . . Bars, hot-rolled sheets on hard-to-get list . . . Plates tight.**

**Breaking Point Near . . .** The post-Labor Day bulge in steel demand will tighten the market to the breaking point. The pinch will affect all products, including some that are now in relatively easy supply.

Strike losses are now beginning to make themselves felt. Producers are dropping as much as two months from fourth quarter allocations in an effort to wipe out heavy carryovers.

Within the last few days, steel mills have been flooded with orders from consumers who are just beginning to realize the seriousness of the situation.

The crisis has reached the point where Washington is getting feelers on the possibility of modified controls for the benefit of so-called defense-supporting industries.

**Controls Unlikely . . .** It's hardly likely that control advocates will get their way. Such a step would inevitably lead to a "me, too" approach on the part of other industries and compound present confusion. But it's an indication of how tight the market has become. The producers, caught in the middle, are trying to make the best of a difficult situation.

Meanwhile, hot-rolled bars and hot-rolled sheets have joined plates, structurals, and pipe on the list of hard-to-get products. Cold-rolled sheets, plentiful before the strike, already are on priority lists, will grow tighter as auto producers move into the market following the model changeover.

It all adds up to a tough fourth quarter for consumers and producers. And carryovers into first quarter will tighten the market after the turn of the year despite some opinion to the contrary. After that, consumers will be striving to rebuild inventories as a hedge against price increases at mid-year.

**Plates Critical . . .** The plate situation is critical. One producer went into the strike with a 90-day carryover on this product. This means he will be unable to take any new business between now and the end of the year.

And some foresighted consumers who had ordered plates to be rolled on sheet mills at a time when sheets were plentiful now find that their chances of getting delivery are slim. The pickup in sheet demand is taking up the slack on sheet mills.

### Steel Output, Operating Rates

Production (Net tons, 000 omitted)	This Week	Last Week	Month Ago	Year Ago
<b>Ingot Index</b> (1947-1949=100)	150.7	149.2	82.0	141.0
<b>Operating Rates</b>				
Chicago	100.0	94.0*	80.0	96.0
Pittsburgh	100.0	98.0	55.0	97.0
Philadelphia	105.0	106.0	66.0	92.0
Valley	95.0	96.0*	60.0	93.0
West	95.0	95.0*	40.0	96.5
Detroit	97.0	97.0	43.0	88.0
Buffalo	107.0	107.0	63.5	100.0
Cleveland	101.0	101.0*	52.0	97.5
Birmingham	93.0	94.0	11.0	94.0
S. Ohio River	93.0	81.0*	73.0	91.5
Upper Ohio R.	100.0	102.0*	73.0	97.0
St. Louis	95.0	89.0	96.0	105.0
Northeast	100.0	95.0	55.0	85.0
<b>Aggregate</b>	98.5	97.5	53.5	94.0

\*Revised

### Prices At A Glance

(cents per lb unless otherwise noted)				
	This Week	Week Ago	Month Ago	Year Ago
<b>Composite price</b>				
Finished Steel, base	5.622	5.622	5.619	5.174
Pig Iron (Gross Ton)	\$63.04*	\$63.04	\$62.95	\$59.09
Scrap, No. 1 hvy (gross ton)	\$58.50	\$58.17	\$55.50	\$43.83
<b>Nonferrous</b>				
Aluminum ingot	27.10	27.10	25.90	23.20
Copper, electrolytic	40.00	40.00*	40.00*	43.00
Lead, St. Louis	15.80	15.80	15.80	12.50
Magnesium	36.00	35.00*	34.50	29.25
Nickel, electrolytic	64.50	64.50	64.50	67.67
Tin, Straits, N. Y.	99.875	99.625	100.25	93.375
Zinc, E. St. Louis	13.50	13.50	13.50	12.50

\*Revised

## Supply Picture Gets Darker

**Revised mill schedules set back orders 60 days . . . With most products solidly booked through the year, supply outlook gets more threatening . . . What strike did to structurals.**

♦ REVISED MILL SCHEDULES, setting back orders 60 days, will help tighten the steel product supply pinch during the fourth quarter.

Solid bookings for most products through the year, coupled with coming auto industry demand for cold-rolled sheets, are other indications that, supply-wise, it will be a lean winter for users.

Scarce supply is already having its full effect. Reports indicate one equipment maker, at least, is ready to close up shop due to a lack of steel, unless emergency tonnages are forthcoming.

The new year holds out little sign of relief. The market then will probably have another firming influence as consumers realize that a price increase will come at mid-year and they try to beat the deadline with orders.

What effect the steel strike had in one product area—fabricated structurals—can be gleaned from American Institute of Steel Construction figures for July.

During that strike-gripped month, industry bookings dipped to 288,166 tons for the first drop below the 300,000 ton mark since 1955. Level of new orders was 33 pct below the highest monthly total in 1954. Shipments in July '55 fell 25 pct below the same month the year before.

Backlog of structural steel fabrication work at the end of the strike had climbed about 45,000 tons above the June total to a level of 2,903,725 tons. Reports from industry indicated that of this amount, 1,227,025 tons were scheduled for fabrication within the following four months period (Aug. to Nov.).

BARS . . . One Pittsburgh warehouse reports there are holes in stocks of all products except cold-finished bars. Prospects for filling these gaps appear slim as revised mill schedules have set back orders 60 days and little tonnage will be booked for the fourth quarter. The situation has, apparently, not registered on warehouse customers. A producer in the area states hot-rolled bars are booked solidly for the rest of the year. Automotive customers are taking less than their normal requirements at present and the implement market is off. In all other markets demand is strong, and automotive will be picking up. In Cleveland, deliveries on hot-rolled bars and reinforcing bars are being quoted a month at a time because of mill production techniques involved in start-up after the strike. Usually the expected off-heats following a strike are diverted into reinforcing bars which have lower specifications than hot-rolled. HR bars come along later when production hits a steady pace. This time area mills had remarkably few post strike off-heats so that most available steel is going into h-r bars. Construction needs are increasing the demand for reinforcing bars. While real trouble isn't evident yet, orders are not being taken beyond one month.

**PLATE AND STRUCTURALS . . .** Steel consumers in Cleveland who jumped at the chance at mid-year to place orders for sheet mill plate may have to wait a long time for delivery. Producers took these orders when the demand for sheet began to drop off due to automotive production cutbacks. With probably about 100,000 tons of this type of material pending, deliveries will be extended well into the fourth quarter because of the revival in demand for sheet. One mill sold over 35,000 tons of this plate in two days. Additional stumbling block is that much equipment for uncoiling and flattening plate up to  $\frac{1}{2}$ -in. thick is not readily available. Word from Pittsburgh indicates that one producer's plans for scheduled improvements on structural and plate mill facilities is welcomed by users of these short-supply products. At Chicago, both plate and structurals are tight. Conversion prices are producing some strip mill plate but not even whetting demand.

**SHEET AND STRIP . . .** Flat rolled capacity of one Pittsburgh mill is booked solidly through the rest of the year. Emphasis on hot-rolled products, in good demand, is putting an additional squeeze on this producer. Except for some slight openings in cold-rolled sheets in September, bookings in Cleveland are practically solid through the year. A slight September gap is due to automotive shutdowns for model changeovers. Hot-rolled sheets are in much heavier demand than cold-rolled and are also booked solid through the fourth quarter. Strip deliveries at Cleveland are being quoted at about 6 weeks. Local producers are finding that, since one mill dropped out of the picture, demand for cold-rolled strip is considerably stronger. Despite some drop-off in automotive and appliance needs, the mills are continuing to offer wider varieties of temper, surface and close edge specifications. In Chicago the sheet picture is aggravated because mills are going to lose some ingots they had expected to get for fourth quarter rolling.

### Purchasing Agent's Checklist

**PRODUCTION:** Plastic coated steel readied for market . . . . . p. 55

**MARKETING:** Consumers' desire for appliances far from satisfied . . . p. 60

**WASHINGTON:** Will Congress cut huge defense outlays? . . . . . p. 73

**WEST COAST:** Rundown on new Far-west firms and those expanding facilities . . . . . p. 75

**WROUGHT IRON . . .** Recent production improvements, A. M. Byers Co., Pittsburgh, announces, now make possible 30 to 45-day delivery of wrought iron plates and other hot-rolled products. The company states that despite shortage of plate, the improvements insure that orders received before mid-September are assured of Nov. 1 delivery.

## Comparison of Prices

(Effective Sept. 4, 1956)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Sept. 4 1956	Aug. 28 1956	Aug. 7 1956	Sept. 6 1956
<b>Flat-Rolled Steel: (per pound)</b>				
Hot-rolled sheets	4.675¢	4.675¢	4.51¢	4.325¢
Cold-rolled sheets	5.75	5.75	5.481	5.325
Galvanized sheets (10 ga.)	6.30	6.30	5.85	5.85
Hot-rolled strip	4.675	4.675	4.469	4.325
Cold-rolled strip	6.870	6.870	6.34	6.29
Plate	4.87	4.87	4.61	4.62
Plates, wrought iron	10.40	10.40	10.40	9.80
Stain's C-R strip (No. 302)	47.50	47.50	44.50	44.50

**Tin and Terneplate: (per base box)**

Tinplate (1.50 lb.) cokes	\$9.85	\$9.85	\$9.85	\$9.05
Tinplate, electro (0.69 lb.)	8.55	8.55	8.55	7.75
Special coated mfg. terne	9.10	9.10	9.10	7.85

**Bars and Shapes: (per pound)**

Merchant bars	5.075¢	5.075¢	4.825¢	4.65¢
Cold finished bars	6.85	6.85	5.90	5.90
Alloy bars	6.125	6.125	5.65	5.65
Structural shapes	5.00	5.00	4.87	4.60
Stainless bars (No. 302)	49.75	49.75	38.25	38.25
Wrought iron bars	11.50	11.50	11.50	10.40

**Wire: (per pound)**

Bright wire	7.20¢	7.20¢	6.60¢	6.25¢
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**Rails: (per 100 lb.)**

Heavy rails	\$5.075	\$5.075	\$4.90	\$4.725
Light rails	6.00	6.00	5.65	5.65

**Seamless Steel: (per net ton)**

Rerolling billets	\$74.00	\$74.00	\$68.50	\$68.50
Slabs, rerolling	74.00	74.00	68.50	68.50
Forging billets	91.50	91.50	84.50	84.50
Alloy blooms, billets, slabs	107.00	107.00	96.00	96.00

**Wire Rod and Skelp: (per pound)**

Wire rods	5.80¢	5.80¢	5.025¢	5.025¢
Skelp	4.225	4.225	4.225	4.225

**Finished Steel Composite: (per pound)**

Base price	5.622¢	5.622¢	5.619¢	5.174¢
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**Finished Steel Composite**

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

**Pig Iron Composite**

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

**Steel Scrap Composite**

Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

**PIG IRON**

Dollars per gross ton, f.o.b., subject to switching charges.

**STAINLESS STEEL**

← To identify producers, see Key on p. 154→

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Bethlehem B3	64.50	65.00	65.50	66.00	.....
Birmingham, Pa. B6	64.50	65.00	65.50	66.00	.....
Birmingham R3	58.50	59.00	.....	.....	.....
Birmingham W9	58.50	59.00	.....	.....	.....
Birmingham U4	58.50	59.00	63.00	.....	.....
Buffalo R3	62.50	63.00	63.50	64.00	.....
Buffalo H1	62.50	63.00	63.50	64.00	.....
Buffalo W6	62.50	63.00	63.50	64.00	.....
Chester P2	64.50	65.00	65.50	.....	.....
Chicago I4	62.50	63.00	63.50	.....	.....
Cleveland A5	62.50	63.00	63.50	63.50	67.50†
Cleveland K3	62.50	63.00	63.50	63.50	67.50†
Duluth I4	62.50	63.00	63.50	63.50	67.50†
Erie I4	62.50	63.00	63.50	63.50	67.50†
Everett M6	63.75	64.25	.....	.....	.....
Fantasia K1	70.00	70.50	.....	.....	.....
Geneva, Utah C7	62.50	63.00	.....	.....	.....
Granite City G2	64.40	64.90	65.40	.....	.....
Hubbard Y1	.....	63.00	.....	.....	.....
Midland C11	62.50	63.00	63.50	63.50	67.50†
Minnequa C6	64.50	65.00	65.50	.....	.....
Moneses P6	62.50	63.00	63.50	63.50	67.50†
Neville Is. P4	62.50	63.00	63.50	63.50	67.50†
N. Tonawanda T1	63.00	63.50	64.00	.....	.....
Pittsburgh U1	62.50	63.00	63.50	.....	.....
Sharpville S3	62.50	63.00	63.50	.....	.....
Se. Chicago R3	62.50	63.00	63.50	.....	.....
Steeltown B3	64.50	65.00	65.50	66.00	70.50
Troy, N. Y. R3	62.50	63.00	63.50	63.50	67.50
Youngstown Y1	62.50	63.00	63.50	63.50	67.50

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	19.75	21.00	20.50	22.00	—	23.25	35.25	28.25	32.75	—	16.00	27.75	16.25
Slabs, billets	24.50	27.25	25.25	28.00	28.50	29.25	44.50	35.75	42.00	—	28.75	—	21.00
Billets, forging	—	33.00	33.75	34.00	37.00	34.00	56.25	42.25	50.25	30.75	27.25	27.75	27.75
Bars, struct.	39.00	39.25	40.50	40.75	43.75	41.00	66.75	50.25	59.00	36.25	32.50	33.00	33.00
Plates	—	41.25	42.50	43.00	45.50	45.75	70.25	54.50	63.75	38.75	33.75	35.50	34.50
Sheets	45.00	45.25	47.25	47.50	55.75	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Strip, hot-rolled	33.00	35.75	34.00	36.75	—	39.75	63.50	48.75	58.25	—	29.75	—	30.75
Strip, cold-rolled	41.50	45.25	43.75	47.50	52.00	50.25	74.75	60.00	73.00	46.50	38.75	46.50	39.25
Wire CF; Rod HR	—	37.25	38.50	38.75	41.75	41.00	63.75	48.00	56.25	34.50	31.00	31.50	31.50

**STAINLESS STEEL PRODUCING POINTS:**

*Sheets:* Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2; J2; Baltimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., I2; Ft. Wayne, J4; Philadelphia, D5.

*Strip:* Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; Leechburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Canton-Massillon, O., R3; Harrison, N. J., D3; Youngstown, C3; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extras); W1 (25¢ per lb higher); New Bedford, Mass., R6; Gary, U1 (25¢ per lb higher).

*Bar:* Baltimore, A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J7; McKeesport, Pa., U1; Ft. Wayne, J4; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J7; Monessen, P1; Syracuse, C11 (25¢ per lb lower on Types 301, 303 and 316); Monessen, P1; Syracuse, C11 (25¢ per lb lower on Type 301, 304 and 306); Bridgeville, U2.

*Structural:* Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

*Plates:* Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., I2; Middletown, U1; Washington, Pa., J2; Cleveland, Massillon, R3; Coatesville, Pa., C11; Philadelphia, D5; Vandercrift, Pa., U1; Gary, U1.

*Forgings billets:* Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R5; Munhall, Pa., S. Chicago, U1.

**DIFFERENTIALS:** Add 50¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phosph., 1.75 to 2.00 pct) 50¢ per ton for each 0.50 pct manganese or portion thereof over 1 pct, \$2 per ton for each 0.75 pct nickel, \$1 per ton for each additional 0.25 pct nickel. \* Add \$1.00 for 0.31 to 0.69 pct low phosph. † Intermediate low phosph. Silvery iron: Buffalo, H1, \$72.50; Jackson, J1, J4 (Globe Div.), \$71.50; Niagara Falls, \$94.50. Add \$1.25 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 14 pct. Add 75¢ for each 0.50 pct manganese over 1.0 pct. Bessemer ferrosilicon: \$64.00.

## Is Scrap Market Leveling Off?

**Strength in most markets is confined to industrial lists . . . Dealers in some areas are having trouble getting top prices while industrial lists continue to climb.**

♦ SOME SCATTERED TALK of a leveling market failed to halt the general upward climb of scrap prices.

In some areas, dealers were having trouble pushing scrap at current figures, but at the same time, industrial scrap was bringing even higher levels and apparently finding a home at all-time record prices.

An example was a tonnage of industrial No. 1 heavy melting steel which brought \$69 f.o.b. near Pittsburgh. Other Pittsburgh lists were up about \$4 over the previous month.

Detroit lists also were strong, but there again dealers were not finding the same enthusiastic market that choice automotive bundles were. In part, the anticipation of renewed auto production and larger lists in the weeks ahead helped hold prices there at their present levels.

Most strength appeared in Chicago, where prices were up at least \$1 all along the list. Other Midwest markets also gained, but in Cleveland some of the steam was disappearing from the market.

As a result of increased strength in the Midwest, THE IRON AGE Composite climbed again, pushing the all time record high a notch higher.

**Pittsburgh . . .** Scrap prices may be on the verge of another upward jump. A mill on the fringe of the district has paid \$62 for No. 1 heavy melting while nearby industrial bundles went for nearly \$69, or more than \$4 over last month. These moves show that the market for scrap is still strong. However, the small amount of dealer scrap bought by area mills is keeping prices in check. One local consumer has a relatively small order out; an-

other major mill has not bought for over 30 days. There is no new buying of turnings. Under these conditions, scrap continues to be drained out of the area.

**Chicago . . .** The market advanced slowly again this week and broker buying continued at delivered prices or higher. No. 1 railroad is a notably difficult item, with broker buying at \$2 to \$3 over previous levels reported common. But scrap in all steelmaking grades is difficult to purchase. Turnings also show exceptional strength, with prices advancing \$2 on blast furnace grades. Industrial No. 1 heavy melting has moved at \$61, confirmed, and at a reported \$64, unconfirmed.

**Philadelphia . . .** This market is holding steady as she goes. A combination of the holidays, and the fact that prices seem to have reached their peak has caused a lull in buying activity. No immediate weakness is anticipated since export demand is strong, taking much which normally would go to mills in the area. Shipments continue to be heavy.

Generation of scrap is definitely picking up. The higher prices however are moving much of metal immediately with little chance for any to build up in dealers yards.

**St. Louis . . .** Steel mills in this district increased prices from \$1 for openhearth grades to \$4 for blast furnace. Changes were in line with those of other markets. Flow of scrap has been steady, but higher prices were required to maintain it.

**New York . . .** Scrap continues to move at last week's price quotations. Demand is unabated from both domestic and foreign sources. Even higher prices are still a definite possibility. A slight slackening in the tempo last week was probably due to the holiday brake on new transactions.

**Detroit . . .** After strengthening last week, prices appeared to be holding the line. One reason is that auto production should increase soon, with renewed generation of prime auto scrap. Meantime, stocks are not high and scrap has been moving in from side areas. Strong mill resistance to recent price advances has caused some of the caution and leveling in prices.

**Cleveland . . .** Much of the steam has gone out of the northeastern Ohio market despite record high prices and a break is possible soon. Electric furnace scrap on the fringes of Youngstown district was sold for \$67 and in the Valley for \$65 on an open end order while dealers were having trouble getting much over \$60 for straight dealer grades. In Cleveland, despite a slow dealer market, auto production lists went for \$66.50.

**Birmingham . . .** The market continues firm. Area mills are not particularly long on inventory and export activity continues to be brisk, and at strong price levels.

**St. Louis . . .** Mills in this district have increased their prices from \$1 for openhearth grades to \$4 a ton for blast furnace grades. The flow of scrap has been steady, but higher prices were needed to keep it coming.

**Cincinnati . . .** The market went up \$2 when a local mill purchased all openhearth grades at slightly higher prices than a fringe area mill recently paid. Bulk of area factory production list went to a local consumer at \$65. Water shipment to Pittsburgh is languishing. Bundles continue loose and many foundries are attempting to use lower grades.

**Buffalo . . .** No significant sales were made here in the past week and prices remain unchanged. Dealer stocks are even lower than before the steel strike, since they have been moving all they can at current high prices.

**Boston . . .** There is some evidence of a slight softening of the price structure here. However, export demand and purchases from Philadelphia area mills keep the market firm and prevent any fluctuation at the moment in prices.

**West Coast . . .** The market in the West is strong. Export to Japan continues to be a factor here and mills on the Coast are producing at top rates.



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kokomo, indiana — warren, ohio — pittsburgh, pa.

## Scrap Prices (Effective Sept. 4, 1956)

### Pittsburgh

No. 1 hvy. melting	\$58.00 to \$59.00
No. 2 hvy. melting	51.00 to 52.00
No. 1 bundles	58.00 to 59.00
No. 2 bundles	47.00 to 48.00
Machine shop turn.	38.00 to 39.00
Mixed bor. and ms. turn.	38.00 to 39.00
Shoveling turnings	42.00 to 43.00
Cast iron borings	42.00 to 43.00
Low phos. punch'gs plate	67.00 to 68.00
Heavy turnings	54.00 to 55.00
No. 1 RR hvy. melting	67.00 to 68.00
Scrap rails, random lgth.	72.00 to 73.00
Rails 2 ft and under	75.00 to 76.00
RR. steel wheels	73.00 to 74.00
RR. spring steel	73.00 to 74.00
RR. couplers and knuckles	73.00 to 74.00
No. 1 machinery cast.	60.00 to 61.00
Cupola cast.	53.00 to 54.00
Heavy breakable cast.	51.00 to 52.00

### Chicago

No. 1 hvy. melting	\$58.00 to \$59.00
No. 2 hvy. melting	48.00 to 49.00
No. 1 factory bundles	65.00 to 67.00
No. 1 dealers' bundles	58.00 to 59.00
No. 2 dealers' bundles	44.00 to 45.00
Machine shop turn.	36.00 to 37.00
Mixed bor. and turn.	38.00 to 39.00
Shoveling turnings	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Low phos. forge crops	72.00 to 73.00
Low phos. punch'gs plate	69.00 to 70.00
Low phos. 3 ft and under	67.00 to 68.00
No. 1 RR. hvy. melting	64.00 to 65.00
Scrap rails, random lgth.	74.00 to 75.00
Rerolling rails	85.00 to 86.00
Rails 2 ft and under	83.00 to 84.00
Locomotive tires, cut	69.00 to 70.00
Cut bolsters & side frames	69.00 to 70.00
Angles and splice bars	74.00 to 75.00
RR. steel car axles	88.00 to 89.00
RR. couplers and knuckles	68.00 to 69.00
No. 1 machine cast	59.00 to 60.00
Cupola cast.	55.00 to 56.00
Heavy breakable cast.	48.00 to 50.00
Cast iron brake shoe	49.00 to 50.00
Cast iron wheel	60.00 to 61.00
Malleable	72.00 to 73.00
Stove plate	50.00 to 51.00
Steel car wheels	69.00 to 70.00

### Philadelphia Area

No. 1 hvy. melting	\$58.00 to \$59.00
No. 2 hvy. melting	49.00 to 50.00
No. 1 bundles	58.00 to 59.00
No. 2 bundles	47.00 to 48.00
Machine shop turn.	40.00 to 41.00
Mixed bor. short turn.	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Shoveling turnings	44.00 to 45.00
Clean cast chem. borings	42.00 to 43.00
Low phos. 5 ft and under	60.00 to 61.00
Low phos. 2 ft and under	62.00 to 63.00
Low phos. punch'gs	62.00 to 63.00
Elec. furnace bundles	60.00 to 61.00
Heavy turnings	54.00 to 55.00
RR. steel wheels	67.00 to 68.00
RR. spring steel	67.00 to 68.00
Rails 18 in. and under	72.00 to 73.00
Cupola cast.	55.00 to 56.00
Heavy breakable cast.	55.00 to 56.00
Cast iron car wheels	64.00 to 65.00
Malleable	68.00 to 69.00
Unstripped motor blocks	35.00 to 36.00
No. 1 machinery cast.	57.00 to 59.00

### Cleveland

No. 1 hvy. melting	\$62.50 to \$63.50
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	62.50 to 63.50
No. 2 bundles	40.00 to 41.00
No. 1 busheling	62.50 to 63.50
Machine shop turn.	34.00 to 35.00
Mixed bor. and turn.	40.00 to 41.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Cut struct'r'l & plates, 2 ft & under	67.00 to 68.00
Drop forge flashings	62.50 to 63.50
Low phos. punch'gs, plate	63.50 to 64.50
Foundry steel, 2 ft & under	56.00 to 57.00
No. 1 RR. heavy melting	66.00 to 67.00
Rails 2 ft and under	80.00 to 81.00
Rails 18 in. and under	81.00 to 82.00
Railroad grate bars	47.00 to 48.00
Steel axle turnings	44.00 to 45.00
Railroad cast.	60.00 to 61.00
No. 1 machinery cast.	57.00 to 58.00
Stove plate	54.00 to 55.00
Malleable	70.00 to 71.00

### Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

### Youngstown

No. 1 hvy. melting	\$64.00 to \$65.00
No. 2 hvy. melting	47.00 to 48.00
No. 1 bundles	64.00 to 65.00
No. 2 bundles	43.00 to 44.00
Machine shop turn.	34.00 to 35.00
Shoveling turnings	40.00 to 41.00
Cast iron borings	40.00 to 41.00
Low phos. plate	65.00 to 67.00

### Buffalo

No. 1 hvy. melting	\$54.00 to \$55.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 busheling	54.00 to 55.00
No. 2 bundles	40.00 to 41.00
Machine shop turn.	30.00 to 31.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	34.00 to 35.00
Cast iron borings	32.00 to 33.00
Low phos. plate	59.00 to 60.00
Scrap rails, random lgth.	57.00 to 58.00
Rails 2 ft and under	65.00 to 66.00
RR. steel wheels	60.00 to 61.00
RR. spring steel	60.00 to 61.00
RR. couplers and knuckles	62.00 to 63.00
No. 1 machinery cast.	52.00 to 53.00
No. 1 cupola cast	48.00 to 49.00

### Detroit

No. 1 hvy. melting	\$54.00 to \$55.00
No. 2 hvy. melting	42.00 to 43.00
No. 1 bundles, openhearth	55.00 to 56.00
No. 2 bundles	35.00 to 36.00
New busheling	53.00 to 54.00
Drop forge flashings	52.50 to 53.50
Machine shop turn.	29.00 to 30.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	32.00 to 33.00
Cast iron borings	32.00 to 33.00
Low phos. punch'gs, plate	53.00 to 54.00
No. 1 cupola cast	51.00 to 52.00
Heavy breakable cast	44.00 to 45.00
Stove plate	45.00 to 46.00
Automotive cast	54.00 to 55.00

### St. Louis

No. 1 hvy. melting	\$52.00 to \$53.00
No. 2 hvy. melting	45.00 to 46.00
No. 1 bundles	53.00 to 54.00
No. 2 bundles	41.00 to 42.00
Machine shop turn.	36.00 to 37.00
Cast iron borings	37.00 to 38.00
Shoveling turnings	37.00 to 38.00
No. 1 RR. hvy. melting	62.50 to 63.50
Rails, random lengths	75.00 to 76.00
Rails 18 in. and under	79.00 to 80.00
Locomotive tires uncut	65.00 to 66.00
Angles and splice bars	68.00 to 69.00
Std. steel car axles	80.00 to 81.00
RR. specialties	68.00 to 69.00
Cupola cast	54.00 to 55.00
Heavy breakable cast	45.00 to 46.00
Cast iron brake shoes	50.00 to 51.00
Stove plate	48.00 to 49.00
Cast iron car wheels	55.00 to 56.00
Rerolling rails	82.00 to 83.00
Unstripped motor blocks	46.00 to 47.00

### Boston

No. 1 hvy. melting	\$50.50 to \$51.50
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	50.50 to 51.50
No. 2 bundles	38.00 to 39.00
No. 1 busheling	50.50 to 51.50
Elec. furnace, 2 ft & under	53.00 to 54.00
Machine shop turn.	28.50 to 29.50
Mixed bor. and short turn.	28.50 to 29.50
Shoveling turnings	32.00 to 33.50
Clean cast chem. borings	31.00 to 32.00
No. 1 machinery cast	45.00 to 46.00
Mixed cupola cast	41.00 to 42.00
Heavy breakable cast	44.00 to 45.00
Stove plate	39.00 to 40.00
Unstripped motor blocks	32.00 to 33.00

### New York

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$52.00 to \$53.00
No. 2 hvy. melting	43.00 to 44.00
No. 1 bundles	39.00 to 40.00
Mixed bor. and turn.	32.00 to 33.00
Shoveling turnings	39.00 to 40.00
Clean cast chem. borings	29.00 to 30.00
No. 1 machinery cast	51.00 to 52.00
Mixed yard cast	47.00 to 48.00
Charging box cast	47.00 to 48.00
Heavy breakable cast	47.00 to 48.00
Unstripped motor blocks	37.00 to 38.00

### Birmingham

No. 1 hvy. melting	\$42.00 to \$43.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 bundles	42.00 to 43.00
No. 2 bundles	34.00 to 35.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	29.00 to 30.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	25.00 to 26.00
Electric furnace bundles	51.00 to 52.00
Bar crops and plate	57.00 to 58.00
Structural and plate, 2 ft.	56.00 to 57.00
No. 1 RR. hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	65.00 to 66.00
Rails, 18 in. and under	71.00 to 72.00
Angles & splice bars	64.00 to 65.00
Rerolling rails	71.00 to 72.00
No. 1 cupola cast	51.00 to 52.00
Stove plate	40.00 to 41.00
Charging box cast	38.00 to 39.00
Cast iron car wheels	43.00 to 44.00
Unstripped motor blocks	44.00 to 45.00
Mashed tin cans	15.00 to 16.00

### Cincinnati

Brokers buying prices per gross ton, on cars:	
No. 1 hvy. melting	\$56.50 to \$57.50
No. 2 hvy. melting	46.00 to 47.00
No. 1 bundles	56.50 to 57.50
No. 2 bundles	42.00 to 43.00
Machine shop turn.	35.50 to 36.50
Mixed bor. and turn.	38.00 to 39.00
Shoveling turnings	38.00 to 39.00
Cast iron borings	38.00 to 39.00
Low phos. 18 in. & under	62.00 to 63.00
Rails, random lengths	67.00 to 68.00
Rails, 18 in. and under	74.00 to 75.00
No. 1 cupola cast	47.00 to 48.00
Heavy breakable cast	47.00 to 48.00
Drop broken cast	58.00 to 59.00

### San Francisco

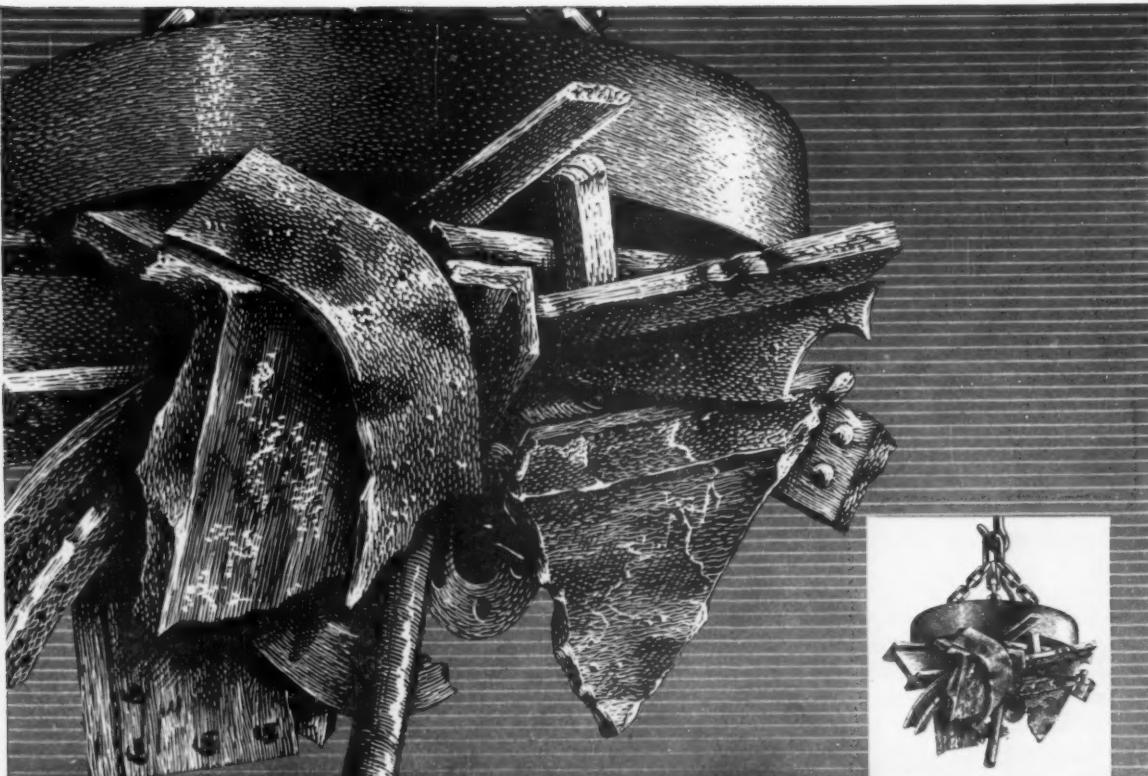
No. 1 hvy. melting	\$50.00
No. 2 hvy. melting	47.00
No. 1 bundles	48.00
No. 2 bundles	42.00
No. 3 bundles	29.00
Machine shop turn.	30.00
Cast iron borings	30.00
No. 1 RR. hvy. melting	50.00
No. 1 cupola cast	55.00

### Los Angeles

No. 1 hvy. melting	\$46.00
No. 2 hvy. melting	44.00
No. 1 bundles	45.00
No. 2 bundles	35.00
No. 3 bundles	33.00
Machine shop turn.	25.00
Shoveling turnings	27.00
Cast iron borings	24.00
Elec. furn. 1 ft and under	47.00
No. 1 RR. hvy. melting	46.00
No. 1 cupola cast	48.00

### Seattle

No. 1 hvy. melting	\$46.00
No. 2 hvy. melting	42.00
No. 2 bundles	31.00
No. 3 bundles	27.00
No. 1 cupola cast	45.00
Mixed yard cast	45.00
No. 1 RR. heavy melting	\$52.00
No. 2 RR. heavy melting	47.00
No. 1 bundles	52.00
No. 2 bundles	42.50
Mixed steel scrap	46.00
Bushelings	39.50
Bush., new fact., prep'd.	50.00
Bush., new fact., unprep'd	46.00
Machine shop turn.	28.00
Short steel turn.	34.00
Mixed bor. and turn.	28.00
Rails, rerolling	60.00
Cast scrap	50.00



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## More Aluminum Supply Ahead

**Olin Mathieson and Revere will form a new aluminum company . . . Capacity 180,000 tons . . . No primary metal will be sold on open market . . . New product development.**

♦ THE ALUMINUM industry has its second wind. With its labor house just about in order, with three year contracts that indicate a good possibility of uninterrupted activity for some time, the industry is again making moves for the future.

Perhaps the biggest and most important potentially was the announcement by Olin Mathieson Chemical Corp. and Revere Copper and Brass Inc. that they were forming a third company to turn out 180,000 tons of primary aluminum per year. This is a modification and expansion of O-M's original plan to go it alone to the tune of 60,000 tons capacity. The cost of the initial plan had been estimated at \$120 million. The current scheme will cost less than twice as much, \$231 million, for three times as much capacity.

However, this added aluminum

output will have no effect on the primary metal market directly. Revere will get one-third of the output, and Olin Mathieson the other two-thirds. None will be sold on the market. Indirectly, it will take both participants off the open market to a great degree, and will mean more mill products available from Revere and O-M. For more details see page 62.

Aluminum Co. of America has announced that, in cooperation with Metallizing Engineering Co., Inc., Westbury, N. Y., it has developed a method for spraying a thin, wear-resistant coat of steel onto aluminum cylinder walls. Its eventual use may be in development of an all aluminum engine.

Alcoa engineers predict the eventual elimination of the need for special slotted pistons, or pistons fitted with expansion control devices. The thin coating of steel

on the aluminum cylinder wall has no effect on its expansion ratio.

Also recently reported on the product development front: A new diecasting technique for making hydraulic valves of aluminum (Char-Lynn Co., Minneapolis),

**MAGNESIUM . . .** Primary ingot production for July fell off from both the previous month and the corresponding month in 1955. The reason was the prolonged strike in a Texas reduction installation. The 1136 tons produced was 81 pct under the 6098 tons in June, and 78 pct below the 5112 tons turned out in July, 1955.

Shipments of wrought products, including extrusions, forgings, sheet and strip, however, nearly held their own, dropping to 1001 tons from 1151 tons shipped the previous month.

Shipments of cast products were basically unaffected by the strike. The 4556 tons shipped in the second quarter was slightly above the tonnage for the first quarter—4493 tons. Total for the first half 1956 outstripped the comparable period in 1955, 9049 tons to 7216.

Diecastings and sand castings shipments fell off slightly in June, 1956. Permanent mold castings and anodes made up part of this but not enough to prevent total shipments in June from dropping off from May, to 1475 from 1512 tons.

In light of these statistics released by the Magnesium Assn., the anticipated output for 1956 must be revised. Considering the fact that some August production was also lost, it is doubtful that 1956 production will reach 70,000 tons.

On the product front, Brooks & Perkins, Inc., Detroit, fabricators of magnesium, report that Underwriters Laboratories, Inc., has extended the voltage, horsepower and temperature ratings requirements for the use of magnesium in AC electric motors. A study was made which resulted in the removal of a number of restrictions. Magnesium alloy castings are now permissible in any AC induction motor up to and including one horsepower.

**GOVERNMENT . . .** Under the International barter program, surplus U. S. agricultural products were swapped for \$1 million worth of aluminum powder from Austria, \$5.7 million worth of tungsten from Argentina, and \$2.8 million worth of rare earths from Brazil, during the first half of 1956.

### Daily Nonferrous Metal Prices

(Cents per lb except as noted)

	Aug. 29	Aug. 30	Aug. 31	Sept. 1	Sept. 3	Sept. 4
Copper, electro, Conn.	40.00	40.00	40.00	40.00	...	40.00
Copper, Lake, delivered	40.00	40.00	40.00	40.00	...	40.00
Tin, Straits, New York	99.625	100.25	100.25	...	...	99.875*
Zinc, East St. Louis	13.50	13.50	13.50	13.50	...	13.50
Lead, St. Louis	15.80	15.80	15.80	15.80	...	15.80

Note: Quotations are going prices.

\*Tentative

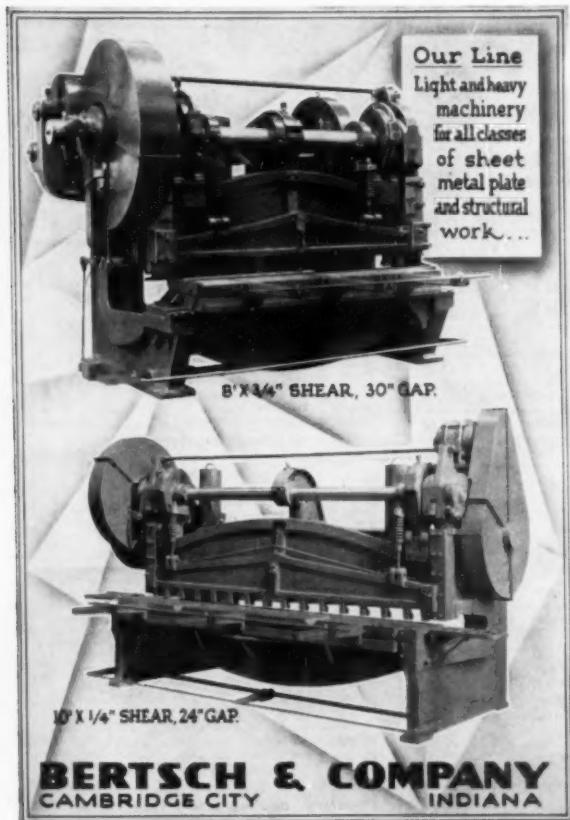
### Monthly Average Metal Prices

(Cents per lb except as noted)

Average prices of the major nonferrous metals in August based on quotations appearing in THE IRON AGE, were as follows:

Electrolytic copper		Straits tin, New York	99.082
Del'd Conn. Valley	40.00	Zinc, E. St. Louis	13.50
Lake copper, delivered	40.00	Lead, St. Louis	15.80

Note: Quotations are going prices.



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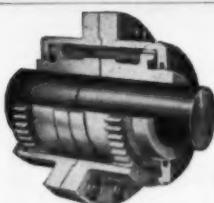
## GOSS and DE LEEUW

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### CHUCKING MACHINES

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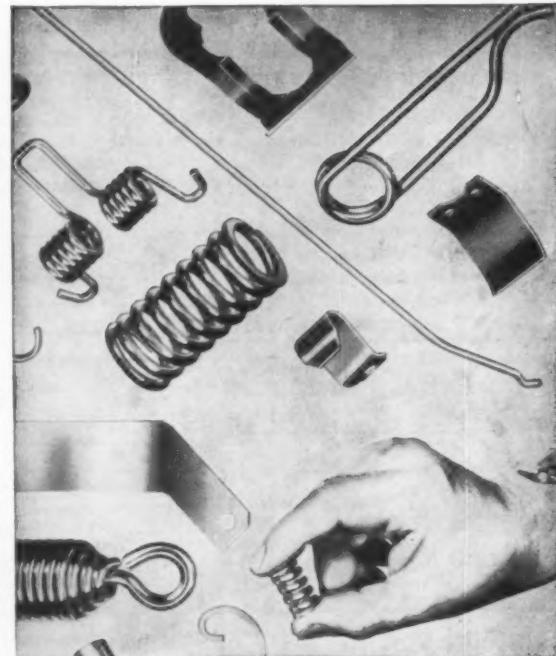
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# Nonferrous Prices

(Effective Sept. 4, 1956)

## MILL PRODUCTS

(Cents per lb, unless otherwise noted)

### ALUMINUM

(Base 30,000 lb, f.o.b. ship. pt., frt. allowed)

#### Flat Sheet (Mill Finish) and Plate (“F” temper except 6061-0)

Alloy	.032	.061	.136	.256
1800, 1100,				
3003.....	44.3	42.1	46.9	46.2
5052.....	51.8	46.8	45.1	42.9
6061-0.....	48.9	44.6	42.8	42.6

#### Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
6-8.....	45.5-47.8	61.3-65.1
12-14.....	46.2-47.7	62.2-66.8
24-26.....	49.4-49.5	73.1-77.8
36-38.....	58.3-59.0	97.4-101.0

#### Screw Machine Stock—2011-T-3

Size*	1/4	3/16-1/2	5/16-1	1 1/4-1 1/2
Price	59.7	58.8	57.4	55.2

#### Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)				
Length"	72	96	120	144
.019 gage.....	\$1.352	\$1.803	\$2.254	\$3.764
.024 gage.....	1.686	2.252	2.815	3.378

#### MAGNESIUM

(f.o.b. shipping pt., carload frt. allowed)

#### Sheet and Plate

Type→	Gage→	.250	.350	.188	.061	.032
		3.00	2.00			
AZ31B Stand, Grade		67.9	69.0	77.8	100.1	
AZ31B Spec.		93.3	95.7	106.7	171.8	
Tread Plate		70.6	71.7			
Tooling Plate	73.0					

#### Extruded Shapes

factor→	6-8	12-14	24-36	48-55
Comm. Grade (AZ31C)	89.8	70.7	75.6	89.3
Spec. Grade (AZ31B)	84.6	85.7	90.6	104.3

#### Alloy Ingot

AZ91B (Die Casting)..... 37.25 (delivered)  
AZ93A, AZ92A, AZ91C (Sand Casting) 40.75 (Velasco, Tex.)

#### NICKEL, MONEL, INCONEL

(Base prices, f.o.b. mill)

"A" Nickel Monel	Inconel
Sheet, CR..... 102	83
Strip, CR..... 102	92
Rod, Bar, HR..... 87	74
Angles, HR..... 87	74
Plate, HR..... 97	87
Seamless tube..... 122	110
Shot, blocks.....	71

## COPPER, BRASS, BRONZE

(Freight included on 500 lbs)

	Sheet	Wire	Rod	Tube
Copper	61.63			61.62
Brass, 70/30	52.10	52.64		55.01
Brass, Low	55.85	56.39	55.75	58.66
Brass, R L	57.19	57.73	57.13	60.00
Brass, Naval	55.72		50.03	58.58
Muntz Metal	53.84	47.85	49.65	
Comm. Bs.	59.06	59.62	59.02	61.64
Mang. Bs.	59.46		53.56	
Phos. Bs. 5%	79.58		80.08	

## Steel deoxidizing aluminum, notch bar

granulated or shot	26.50-27.00
Grade 1—95-97 1/4%	26.50-27.00
Grade 2—92-95%	25.50-26.00
Grade 3—90-92%	24.50-25.00
Grade 4—85-90%	24.00-24.50

## SCRAP METALS

### Brass Mill Scrap

(Cents per pound, add 1¢ per lb for	shipments of 20,000 lb and over)
Heavy	Turnings
Copper	26 1/2
Yellow brass	26 1/2
Red brass	21 1/2
Comm. bronze	22 1/2
Mang. bronze	25 1/2
Yellow brass rod ends	27

### Custom Smelters Scrap

(Cents per pound carload lots, delivered	to refinery)
No. 1 copper wire	23 1/2
No. 2 copper wire	22 1/2
Light copper	30 1/2
No. 1 composition	29 1/2
No. 1 comp. turnings	29 1/2
Hvy. yellow brass solids	20 1/2
Brass pipe	21 1/2
Radiators	22 1/2

### Dealers' Scrap

(Dealers' buying price, f.o.b. New York	in cents per pound)
No. 1 copper wire	33 1/2
No. 2 copper wire	32
Light copper	29 1/2
No. 1 composition	30
No. 1 comp. turnings	29 1/2
Unlined red car boxes	20 1/2
Cocks and faucets	19 1/2
Clean heavy yellow brass	17 1/2
Brass pipe	20 1/2
New soft brass clippings	22 1/2
No. 1 brass rod turnings	19 1/2-20 1/2

### Aluminum

Alum. pistons and struts	8	8 1/2
Aluminum crankcases	13	13 1/2
1100 (28) aluminum clippings	16	16 1/2
Old sheet and utensils	13	13 1/2
Borings and turnings	9	9
Industrial castings	13	13 1/2
2024 (24S) clippings	14 1/2	15

### Zinc

New zinc clippings	7 1/2	8
Old zinc	4 1/2	5
Zinc routings	2 1/2	3
Old die cast scrap	2 1/2	2 1/2

### Nickel and Monel

Pure nickel clippings	21.85-\$1.95
Clean nickel turnings	21.55-\$1.65
Nickel anodes	21.85-\$1.95
Nickel rod ends	21.85-\$1.95
New Monel clippings	20-30
Clean Monel turnings	20-30
Old sheet Monel	20-30
Nickel silver clippings, mixed	21
Nickel silver turnings, mixed	18

### Lead

Soft scrap lead	12 1/2-13
Battery plates (dry)	7-7 1/2
Batteries, acid free	4 1/2

### Miscellaneous

Block tin	80	81
No. 1 powder	62 1/2	63
Auto babbitt	42	42 1/2
Mixed common babbitt	13	13 1/2
Solder joints	18	18 1/2
Siphon tops	42	42
Small foundry type	15 1/2	15 1/2
Monotype	14 1/2	15
Lino. and stereotype	13	13 1/2
Electrotype	12 1/2	12 1/2
Hand picked type shells	10	10 1/2
Lino. and stereo. drops	5 1/2	5 1/2
Electro. drops	4 1/2	4 1/2

IRON AGE		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.													
STEEL PRICES		BILLETS, BLOOMS, SLABS			PIL-ING		SHAPES STRUCTURALS			STRIP					
(Effective Sept. 4, 1956)		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled	
EAST	Bethlehem, Pa.				\$107.00 B3		5.05 B3	7.40 B3	5.05 B3						
	Buffalo, N. Y.	\$74.00 B3, R3	\$91.50 B3, R3	\$107.00 B3, R3	5.90 B3	5.05 B3	7.40 B3	5.05 B3	4.875 B3, R3	6.85 R7	6.95 B3				
	Claymont, Del.														
	Harrison, N. J.													14.55 C11	
	Conshohocken, Pa.	\$96.50 A2	\$114.00 A2						4.725 A2	6.90 A2	6.95 A2				
	New Bedford, Mass.									7.30 R6					
	Johnstown, Pa.	\$74.00 B3	\$91.50 B3	\$107.00 B3		5.05 B3	7.40 B3								
	Boston, Mass.									7.40 T8				14.90 T8	
	New Haven, Conn.										7.30 A5				
	Baltimore, Md.										6.85 T8				
	Pheonixville, Pa.					5.85 P2		5.85 P2							
	Sparrows Pt., Md.								4.875 B3		6.95 B3				
	Bridgeport, Wallingford, Conn.	\$79.00 N8	\$96.50 N8	\$107.00 N8						7.30 W1, 6.95 T8					
	Pawtucket, R. I. Worcester, Mass.									7.40 A5, N7				14.90 N7	
MIDDLE WEST	Alton, Ill.								4.875 L1						
	Ashland, Ky.								4.875 A7						
	Canton-Massillon, Dover, Ohio		\$94.00 R3	\$107.00 R3 T5						6.85 G4		10.10 G4		14.55 G4	
	Chicago, Ill. Franklin Park, Ill.	\$74.00 U1, R3	\$91.50 U1, R3, W8	\$107.00 U1, R3, W8	5.90 U1	5.00 U1, W6	7.35 U1, Y1, 6.00 W8	5.00 U1	4.875 N4, 4.875 A1	6.95 A1, T8			7.75 W8, S9	14.55 A1, S9, T8	
	Cleveland, Ohio									6.85 A5, J3			7.75 J3		
	Detroit, Mich.								4.775 G3, M2	6.95 M2, G3, D2, P11	7.05 G3	10.10 G3, S1, D2	7.05 G3		
	Anderson, Ind.									6.85 G4		10.10 G4			
	Duluth, Minn.														
	Gary, Ind. Harbor, Indiana	\$74.00 U1	\$91.50 U1	\$107.00 U1, Y1	5.90 I3	5.00 U1	7.35 U1, I3	5.00 I3	4.875 U1, I3, Y1	6.95 Y1	6.95 U1, I3, Y1	10.20 Y1	7.75 U1, Y1		
	Sterling, Ill.	\$74.00 N4							4.775 N4						
	Indianapolis, Ind.									7.00 C5					
	Newport, Ky.												7.75 N5		
	Middletown, Ohio									6.85 A7					
	Niles, Warren, Ohio Sharon, Pa.		\$91.50 S1, C10	\$107.00 S1 C10					4.875 S1, R3	6.85 T4	6.95 S1, R3	10.00 S1, R3	7.75 S1	14.55 S1	
WEST	Pittsburgh, Pa. Midland, Pa. Butler, Pa.	\$74.00 U1, J3	\$91.50 U1, J3, C11	\$107.00 U1, C11	5.90 U1	5.00 U1, J3	7.35 U1, J3	5.00 U1	4.875 P6	5.750 P6, 6.85 J3, B4, S7			7.75 S9	14.55 S9	
	Portsmouth, Ohio														
	Wairoton, Wheeling, Fellowsboro, W. Va.					5.00 W3			4.875 W3	6.85 W3, F3	6.95 W3	9.65 W3			
	Youngstown, Ohio	\$74.00 R3	\$91.50 Y1, C10	\$107.00 Y1		5.00 Y1	7.35 Y1		4.875 U1, Y1	6.85 Y1, C5	6.95 U1, Y1	10.20 Y1	7.75 U1, Y1		
	Fontana, Cal.	\$83.50 K1	\$101.00 K1	\$128.00 K1		5.70 K1	8.05 K1	5.85 K1	5.475 K1	8.80 K1					
	Geneva, Utah	\$91.50 C7				5.00 C7	7.35 C7								
	Kansas City, Mo.					5.10 S2	7.45 S2		4.925 S2		7.20 S2		6.375 S2		
SOUTH	Los Angeles, Torrance, Cal.		\$101.00 B2	\$127.00 B2		5.70 C7, B2	8.05 B2		5.425 B2, C7	8.90 C1				8.95 B2	
	Minnequa, Colo.					5.30 C6			5.775 C6						
	Portland, Ore.					5.75 O2									
	San Francisco, Niles, Pittsburg, Cal.		\$101.00 B2			5.45 B2	8.00 B2		5.425 C7, B2						
	Seattle, Wash.		\$105.00 B2			5.75 B2	8.10 B2		5.875 B2						
SOUTH	Atlanta, Ga.								4.875 A8						
	Fairfield, Ala. City, Birmingham, Ala.	\$74.00 T2	\$91.50 T2			5.00 T2, R3	7.35 T2		4.875 T2, R3, 4.875 C16		6.95 T2				
	Houston, Lone Star, Texas		\$96.50 S2	\$112.00 S2			7.45 S2			7.20 S2					

## STEEL PRICES

(Effective Sept. 4, 1956)

*Italics* identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

EAST	SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
	Hot-rolled 1/8 ga. & hrvr.	Cold- rolled	Galvanized 10 ga.	Embell- ing 12 ga.	Long Terne 10 ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot- rolled 1/9 ga.		Cokes* 1.25-lb. base box	Electro* 0.25-lb. base box		
Bethlehem, Pa.														
Buffalo, N. Y.	4.675 B3	5.75 B3				6.90 B3	8.525 B3			5.80 W6	† Special coated mig. terns deduct 50¢ from 1.25-lb. coke base box price. Can-making quality blackplate 55 to 128 lb. deduct \$2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.00. Differ- ential 1.00 lb./0.25 lb. add 65¢.			
Claymont, Del.														
Coatesville, Pa.														
Conshohocken, Pa.	4.725 A2	5.80 A2				6.95 A2								
Harrisburg, Pa.														
Hartford, Conn.														
Johnstown, Pa.										5.80 B3				
Fairless, Pa.	4.725 U1	5.80 U1				6.95 U1	8.575 U1				59.70 U1	\$8.40 U1		
New Haven, Conn.														
Phoenixville, Pa.														
Sparrows Pt., Md.	4.675 B3	5.75 B3	6.30 B3			6.90 B3	8.575 B3	9.275 B3		5.90 B3	\$9.70 B3			
Worcester, Mass.										6.10 A5				
Trenton, N. J.														
Alton, Ill.											6.00 L1			
Ashland, Ky.	4.675 A7	5.75 A7	6.30 A7	6.325 A7										
Canton-Massillon, Dover, Ohio				6.30 R3, R1	6.325 R3									
Chicago, Joliet, Ill.	4.675 W8, A1					6.90 U1				5.80 K2	5.80 A5, R3, N4, W8			
Sterling, Ill.											5.90 N4			
Cleveland, Ohio	4.675 J3, R3	5.75 J3, R3		6.325 R3		6.90 R3	8.525 R3, J3			5.80 A5				
Detroit, Mich.	4.775 G3, M2	5.85 G3 5.75 M2				7.00 G2	8.625 G3							
Newport, Ky.	4.675 N5	5.75 N5												
Gary, Ind. Harbor, Indiana	4.675 U1, J3, Y1	5.75 U1, J3, Y1	6.30 U1, J3	6.325 U1, J3, Y1	6.70 U1	6.90 U1, Y1, J3	8.525 U1, Y1			5.80 Y1	\$9.60 U1, J3, Y1	\$8.30 J3, U1, Y1	7.15 U1, Y1	
Granite City, Ill.	4.675 G2	5.95 G2	6.50 G2	6.525 G2								\$8.40 G2	7.25 G2	
Kokomo, Ind.				6.40 C9							5.90 C9			
Mansfield, Ohio			5.75 E2			6.70 E2								
Middletown, Ohio			5.75 A7	6.30 A7	6.325 A7	6.70 A7								
Niles, Warren, Ohio Sharon, Pa.	4.675 S1, R3, N3	5.75 R3	6.30 R3	6.325 N3	6.70 N3	6.90 S1, R3	8.525 S1, R3					8.30 R3		
Pittsburgh, Pa. Midland, Pa. Butler, Pa.	4.675 U1, J3, P6	5.75 U1, J3, P6	6.30 U1, A1, J3	6.325 U1, A1	6.90 U1, J3, R3	8.525 U1, J3	9.275 U1			5.80 A5, P6, J3	\$9.60 J3, U1	\$8.30 U1	7.15 U1	
Portsmouth, Ohio	4.675 P7	5.75 P7								5.80 P7				
Weirton, Wheeling, Follansbee, W. Va.	4.675 W3, W5	5.75 W3, W5	6.30 W3, W5		6.70 W3, W5	6.90 W3	8.525 W3				\$9.60 W5	\$8.30 W5	7.15 W5 7.40 W3	
Youngstown, Ohio	4.675 U1, Y1	5.75 Y1			6.325 Y1	6.90 Y1	8.525 Y1			5.80 Y1			7.15 Y1	
Fontana, Cal.	5.475 K1	6.95 K1				7.70 K1	9.725 K1					\$10.35 K1	\$9.65 K1	
Genoa, Utah	4.775 C7													
Kansas City, Mo.											6.85 S2			
Los Angeles, Terrace, Cal.											6.60 B2			
Minneapolis, Cal.											6.85 C6			
San Francisco, Niles, Pittsburg, Cal.	5.375 C7	6.70 C7	7.85 C7								6.45 C7	\$10.35 C7	\$9.65 C7	
Seattle, Wash.														
Atlanta, Ga.														
Fairfield, Ala. Alabama City, Ala.	4.675 T2, R3	5.75 T2, R3	6.30 T2, R3							5.80 T2, R3	\$9.70 T2	\$8.40 T2		
Houston, Tex.										6.65 S2				

IRON AGE <b>STEEL PRICES</b> (Effective Sept. 4, 1956)		Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.										
		BARS					PLATES				WIRE	
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem				6.125 B3	8.325 B3	7.40 B3					
	Buffalo, N. Y.	5.075 B3, R3	5.075 B3, R3	6.90 B5	6.125 B3, R3	8.325 B5, B3	7.40 B3	4.85 B3				7.20 B6
	Clayment, Del.							5.35 C4		6.85 C4	7.55 C4	
	Coatesville, Pa.							5.25 L4		6.85 L4	7.55 L4	
	Conshohocken, Pa.							4.90 A2	5.925 A2	6.25 A2	7.25 A2	
	Harrisburg, Pa.							5.80 P2	6.275 C3			
	Hartford, Conn.			7.35 R3		8.625 R3	7.40 B3					
	Johnstown, Pa.	5.075 B3	5.075 B3		6.125 B3			4.85 B3		6.85 B3	7.25 B3	7.20 B3
	Fairless, Pa.	5.225 U1	5.225 U1		6.275 U1							
	Newark, N. J.			7.30 W10		8.50 W10						
	Camden, N. J.			7.30 P10		8.50 P10						
	Bridgeport, Conn.	5.30 N8	5.30 N8	7.20 N8 7.40 W10	6.20 N8	8.475 N8	7.50 N8					
	Sparrows Pt., Md.		5.075 B3					4.85 B3		6.85 B3	6.85 B3	7.30 B3
	Palmer, Worcester, Readville, Mass.	5.225 M7	5.225 M7	7.40 B5, C14		8.325 A5						7.50 A5, W6
	Milton, Pa.					8.625 B5						9.025 T8
	Spring City, Pa.			7.30 K4		8.50 K4						
	Alton, Ill.	5.275 L1										7.40 L1
	Ashland, Newport, Ky.							4.85 A7, N5		6.85 N5		
	Canton-Maassillon, Ohio			6.85 R3, R2	6.125 R3, T5	8.325 R3, R2, T5						
MIDDLE WEST	Chicago, Joliet, Ill.	5.075 U1, R3, W8, N4, S.575 P13	5.075 U1, R3, N4, S.575 P13	6.85 A5, B5, W10, L2, W8, L2, N9	6.125 U1, R3, W8	8.325 A5, B5, W8, L2, N9, W10	5.875 W8	4.85 U1, I3, W8, A1	5.925 U1	6.85 U1, W8	7.25 U1	7.20 A5, R3, N4, W7
	Cleveland, Ohio	5.075 R3	5.075 R3	6.85 A5, C13		8.325 A5, C13	7.425 R3	4.95 J3, R3	5.925 J3		7.25 J3, R3	7.20 A5, C13
	Detroit, Mich.	5.175 G3	5.425 G3	7.05 B5, P8 7.10 P3	6.225 G3	8.525 B5, P3, P8	7.325 G3	4.95 G3		6.90 G3		
	Duluth, Minn.											7.20 A5
	Gary, Ind. Harbor, Crawfordsville	5.075 U1, I3, Y1	5.075 U1, I3, Y1	6.85 R3, M5	6.125 U1, I3, Y1	8.325 R3, M4	7.425 U1, I3, Y1	4.85 U1, I3, Y1	5.925 I3	6.85 U1, Y1	7.25 U1, Y1	7.30 M4
	Granite City, Ill.								5.05 G2			
	Kokomo, Ind.											7.30 C9
	Sterling, Ill.	5.525 N4	5.175 N4									
	Niles, Warren, Ohio Sharon, Pa.			6.85 C10, C11	6.125 C10, S1	8.325 C10	7.425 S1	4.85 S1, R3		6.85 S1	7.25 S1, R3	
	Pittsburgh, Pa. Midland, Pa.	5.075 U1, C11, J3	5.075 U1, J3	6.85 A5, C8, C11, J3, R3, S9, B4, W10	6.125 U1, C11	8.325 A5, R3, S9, C8, W10	7.425 U1, J3	4.85 U1, J3	5.925 U1	6.85 U1, J3	7.25 U1, J3	7.20 A5, J3, P6
	Portsmouth, Ohio											8.40 P7
	Weirton, Wheeling, Fallamore, W. Va.							4.85 W5				
	Youngstown, Ohio	5.075 U1, Y1, R3	5.075 U1, Y1, R3	6.85 U1, Y1, F2	6.125 U1, Y1	8.325 Y1, F2	7.425 U1, Y1	4.85 U1, Y1, R3		6.85 Y1	7.25 Y1	7.20 Y1
	Emeryville, Cal.											
	Fontana, Cal.	5.775 K1	5.775 K1		7.175 K1		8.125 K1	5.55 K1		7.55 K1	7.95 K1	
	Geneva, Utah	5.175 C7						4.85 C7			7.25 C7	
	Kansas City, Mo.	5.325 S2	5.325 S2		5.325 S2		7.675 S2					7.45 S2
	Los Angeles, Torrance, Cal.	5.775 C7, B2	5.775 C7, B2	8.30 R3	7.175 B2		8.125 B2					8.15 B2
	Minnequa, Colo.	5.525 C6	5.525 C6					5.70 C6				7.45 C6
	Portland, Ore.	5.825 O2										
	San Francisco, Niles, Pittsburgh, Cal.	5.775 C7 5.825 R2	5.775 C7 5.825 B2				8.175 B2					8.15 C7, C6
	Seattle, Wash.	5.825 B2 5.825 N6	5.825 B2				8.175 B2	5.75 B2		7.75 B2	8.15 B2	
SOUTH	Atlanta, Ga.	5.575 A8										7.40 A8
	Fairfield, Ala. City, Birmingham, Ala.	5.075 T2, R3 5.375 C16	5.075 T2, R3 5.375 C16				7.425 T2	4.85 T2, R3			7.25 T2	7.20 T2, R3
	Houston, Ft. Worth, Lone Star, Tex.	5.325 S2	5.325 S2		6.375 S2		7.675 S2	4.95 S2		6.95 S2		7.45 S2

# Steel Prices (Effective Sept. 4, 1956)

## Key to Steel Producers

### With Principal Offices

**A1** Acme Steel Co., Chicago  
**A2** Alan Wood Steel Co., Conshohocken, Pa.  
**A3** Allegheny Ludlum Steel Corp., Pittsburgh  
**A4** American Cladmetals Co., Carnegie, Pa.  
**A5** American Steel & Wire Div., Cleveland  
**A6** Angell Nail & Chaplet Co., Cleveland  
**A7** Armcro Steel Corp., Middletown, Ohio  
**A8** Atlantic Steel Co., Atlanta, Ga.  
  
**B1** Babcock & Wilcox Tube Div., Beaver Falls, Pa.  
**B2** Bethlehem Pacific Coast Steel Corp., San Francisco  
**B3** Bethlehem Steel Co., Bethlehem, Pa.  
**B4** Blair Strip Steel Co., New Castle, Pa.  
**B5** Bliss & Laughlin, Inc., Harvey, Ill.  
**B6** Brook Plant, Wickwire Spencer Steel Div., Birkdale, Pa.  
  
**C1** Calstrip Steel Corp., Los Angeles  
**C2** Carpenter Steel Co., Reading, Pa.  
**C3** Central Iron & Steel Co., Harrisburg, Pa.  
**C4** Claymont Products Dept., Claymont, Del.  
**C5** Cold Metals Products Co., Youngstown, O.  
**C6** Colorado Fuel & Iron Corp., Denver  
**C7** Columbia Geneva Steel Div., San Francisco  
**C8** Columbia Steel & Shafing Co., Pittsburgh  
**C9** Continental Steel Corp., Kokomo, Ind.  
**C10** Copperweld Steel Co., Pittsburgh, Pa.  
**C11** Crucible Steel Co. of America, Pittsburgh  
**C12** Cumberland Steel Co., Cumberland, Md.  
**C13** Cuyahoga Steel & Wire Co., Cleveland  
**C14** Compressed Steel Shafing Co., Readville, Mass.  
**C15** G. O. Carlson, Inc., Thorndale, Pa.  
**C16** Connors Steel Div., Birmingham  
**C17** Chester Blast Furnace, Inc., Chester, Pa.  
  
**D1** Detroit Steel Corp., Detroit  
**D2** Detroit Tube & Steel Div., Detroit  
**D3** Driver Harris Co., Harrison, N. J.  
**D4** Dickson Weatherproof Nail Co., Evanston, Ill.  
**D5** Henry Disston Div., Philadelphia  
  
**E1** Eastern Stainless Steel Corp., Baltimore  
**E2** Empire Steel Co., Manifield, O.  
**F1** Firth Sterling, Inc., McKeesport, Pa.  
**F2** Fitzsimmons Steel Corp., Youngstown  
**F3** Follansbee Steel Corp., Follansbee, W. Va.

**G2** Granite City Steel Co., Granite City, Ill.  
**G3** Great Lakes Steel Corp., Detroit  
**G4** Greer Steel Co., Dover, O.  
  
**H1** Hanna Furnace Corp., Detroit  
**H2** Ingersoll Steel Div., Chicago  
**H3** Inland Steel Co., Chicago  
**H4** Interlake Iron Corp., Cleveland  
  
**J1** Jackson Iron & Steel Co., Jackson, O.  
**J2** Jencop Steel Corp., Washington, Pa.  
**J3** Jones & Laughlin Steel Corp., Pittsburgh  
**J4** Joslyn Mfg. & Supply Co., Chicago  
**J5** Judson Steel Corp., Emeryville, Calif.  
  
**K1** Kaiser Steel Corp., Fontana, Cal.  
**K2** Keystone Steel & Wire Co., Peoria  
**K3** Koppers Co., Granite City, Ill.  
**K4** Keystone Drawn Steel Co., Spring City, Pa.  
  
**L1** Laclede Steel Co., St. Louis  
**L2** La Salle Steel Co., Chicago  
**L3** Lone Star Steel Co., Dallas  
**L4** Lukens Steel Co., Coatesville, Pa.  
  
**M1** Mahoning Valley Steel Co., Niles, O.  
**M2** McLoch Steel Corp., Detroit  
**M3** Mercer Tube & Mfg. Co., Sharon, Pa.  
**M4** Mid-States Steel & Wire Co., Crawfordsville, Ind.  
**M5** Monarch Steel Div., Hammond, Ind.  
**M6** Mystic Iron Works, Everett, Mass.  
**M7** Milton Steel Products Div., Milton, Pa.  
  
**N1** National Supply Co., Pittsburgh  
**N2** National Tube Div., Pittsburgh  
**N3** Niles Rolling Mill Div., Niles, O.  
**N4** Northwestern Steel & Wire Co., Sterling, Ill.  
**N5** Newport Steel Corp., Newport, Ky.  
**N6** Northwest Steel Rolling Mill, Seattle  
**N7** Newman Crosby Steel Co., Pawtucket, R. I.  
**N8** Northeastern Steel Corp., Bridgeport, Conn.  
**N9** Nelson Steel & Wire Co.  
  
**O1** Oliver Iron & Steel Co., Pittsburgh  
**O2** Oregon Steel Mills, Portland  
  
**P1** Page Steel & Wire Div., Monessen, Pa.  
**P2** Phoenix Iron & Steel Co., Phoenixville, Pa.  
**P3** Pilgrim Drawn Steel Div., Plymouth, Mich.  
**P4** Pittsburgh Coke & Chemical Co., Pittsburgh  
**P5** Pittsburgh Screw & Bolt Co., Pittsburgh  
**P6** Pittsburgh Steel Co., Pittsburgh  
**P7** Portsmouth Div., Detroit Steel Corp., Detroit  
**P8** Plymouth Steel Co., Detroit  
  
**P9** Pacific States Steel Co., Niles, Cal.  
**P10** Precision Drawn Steel Co., Camden, N. J.  
**P11** Production Steel Strip Co., Detroit  
**P13** Phoenix Mfg. Co., Joliet, Ill.  
  
**R1** Reeves Steel & Mfg. Co., Dover, O.  
**R2** Reliance Div., Eaton Mfg. Co., Massillon, O.  
**R3** Republic Steel Corp., Cleveland  
**R4** Roebling Sons Co., John A., Trenton, N. J.  
**R5** Rotary Electric Steel Co., Detroit  
**R6** Rodney Metals, Inc., New Bedford, Mass.  
**R7** Rome Strip Steel Co., Rome, N. Y.  
  
**S1** Sharon Steel Corp., Sharon, Pa.  
**S2** Sheffield Steel Div., Kansas City  
**S3** Shenango Furnace Co., Pittsburgh  
**S4** Simonds Saw and Steel Co., Fitchburg, Mass.  
**S5** Sweet's Steel Co., Williamsport, Pa.  
**S6** Standard Forging Corp., Chicago  
**S7** Stanley Works, New Britain, Conn.  
**S8** Superior Drawn Steel Co., Monaca, Pa.  
**S9** Superior Steel Corp., Carnegie, Pa.  
**S10** Seneca Steel Service, Buffalo  
  
**T1** Tonawanda Iron Div., N. Tonawanda, N. Y.  
**T2** Tennessee Coal & Iron Div., Fairfield  
**T3** Tennessee Products & Chem. Corp., Nashville  
**T4** Thomas Strip Div., Warren, O.  
**T5** Timken Steel & Tube Div., Canton, O.  
**T7** Texas Steel Co., Fort Worth  
**T8** Thompson Wire Co., Boston  
  
**U1** United States Steel Corp., Pittsburgh  
**U2** Universal-Cyclops Steel Corp., Bridgeville, Pa.  
**U3** Ulbrich Stainless Steels, Wallingford, Conn.  
**U4** U. S. Pipe & Foundry Co., Birmingham  
  
**W1** Wallingford Steel Co., Wallingford, Conn.  
**W2** Washington Steel Corp., Washington, Pa.  
**W3** Weirton Steel Co., Weirton, W. Va.  
**W4** Wheatland Tube Co., Wheatland, Pa.  
**W5** Wheeling Steel Corp., Wheeling, W. Va.  
**W6** Wickwire Spencer Steel Div., Buffalo  
**W7** Wilson Steel & Wire Co., Chicago  
**W8** Wisconsin Steel Div., S. Chicago, Ill.  
**W9** Woodward Iron Co., Woodward, Ala.  
**W10** Wyckoff Steel Co., Pittsburgh  
**W12** Wallace Barnes Steel Div., Bristol, Conn.  
  
**Y1** Youngstown Sheet & Tube Co., Youngstown, O.

## PIPE AND TUBING

Base discounts (per cent) f.o.b. mills. Base price about \$200 per net ton.

STANDARD T. & C.	BUTTWELD												SEAMLESS													
	1/2 in.		3/4 in.		1 in.		1 1/4 in.		1 1/2 in.		2 in.		2 1/2-3 in.		2 in.		2 1/2 in.		3 in.		3 1/2-4 in.					
	Blk.	Gal.																								
Sparrows Pt. B3	10.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Youngstown R3	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Fontana K1	.....	+15.25	3.00	+11.25	5.50	+7.75	8.00	+7.00	8.50	+6.80	9.00	+5.50	10.50	+5.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Pittsburgh J3	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25	.....	.....		
Alton, Ill. L1	16.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Sharon M1	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Fairless N2	16.50	+4.75	13.50	+0.75	16.00	2.75	18.50	3.50	19.00	4.50	19.50	5.00	21.00	4.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Pittsburgh N1	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25	.....	.....		
Wheeling W5	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Wheatland W4	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Youngstown Y1	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25	.....	.....		
Indiana Harbor Y1	11.50	+5.75	14.50	1.25	17.00	3.75	19.50	4.50	20.00	5.50	20.50	6.00	22.00	5.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Lorain N2	12.50	+2.75	15.50	1.25	18.00	4.75	20.50	5.50	21.00	6.50	21.50	7.00	23.00	6.75	+2.00	+17	4.50	+12.25	7.00	+9.75	8.50	+8.25	.....	.....		
<b>EXTRA STRONG PLAIN ENDS</b>	<b>.....</b>	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....		
Sparrows Pt. B3	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown R3	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Fairless N2	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Fontana K1	4.50	.....	8.50	10.50	11.00	.....	11.50	.....	12.00	.....	12.50	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Pittsburgh J3	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25	.....	.....		
Alton, Ill. L1	15.00	1.25	19.00	5.25	21.00	8.75	21.50	7.50	22.00	8.50	22.50	9.00	23.00	7.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Sharon M3	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Pittsburgh M3	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25	.....	.....		
Wheeling W5	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Wheatland W4	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Youngstown Y1	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25	.....	.....		
Indiana Harbor Y1	18.00	8.25	20.00	6.25	22.00	9.75	22.50	8.50	23.00	9.50	23.50	10.00	22.00	8.75	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	
Lorain N2	17.00	3.25	21.00	7.25	23.00	10.75	23.50	9.75	24.00	10.50	24.50	11.00	25.00	9.75	+0.50	+14.50	7.00	+8.75	9.50	+6.25	14.50	+1.25	.....	.....		

Threads only, butt-weld and seamless 2 1/2 pt. higher discount. Plain ends, butt-weld and seamless, 3-in. and under, 5 1/2 pt. higher discount. Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 13.50¢ per lb.

(Effective Sept. 4, 1956)

To identify producers, see Key on preceding page

## TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	SAE
15	4	1	—	—	\$1.68	T-1
15	4	1	—	5	2.385	T-2
15	4	2	—	—	1.845	T-2
1.5	4	1.5	8	—	1.04	M-1
6	4	3	6	—	1.43	M-3
6	4	2	5	—	1.185	M-2
High-carbon chromium					.83	D-3, D-5
Oil hardened manganese					.45	O-2
Special carbon					.41	W-1
Extra carbon					.345	W-1
Regular carbon					.29	W-1
Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.						

## CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (A3, J2, L4)		Sheet (J2)	
	10 pct	15 pct	20 pct	20 pct
304	34.60	38.00	41.50	—
316	39.70	43.20	46.65	—
321	36.35	39.80	43.50	—
347	39.50	43.95	48.45	—
405	29.20	33.15	37.05	—
410, 430	28.70	32.65	36.55	—

CR Strip (S9) Copper, 10 pct, 2 sides, 41.40; 1 side, 33.60.

## ELECTRICAL SHEETS

F.o.b. Mill Cents Per Lb	22-Gage (Cut Lengths)*	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
			Semi- Processed	Fully Processed
			Grain Oriented	Grain Oriented
Field	9.00	9.20	—	—
Armature	10.35	10.35	10.85	—
Elect.	11.00	11.025	11.525	—
Meter	12.05	12.075	12.575	—
Dynamo	13.05	13.05	13.55	—
Trans. 72	14.05	14.05	14.55	—
Trans. 65	14.60	—	—	—
Trans. 58	15.10	—	18.50	—
Trans. 52	16.15	—	Trans. 73	19.00

Producing points: Beech Bottom (W5); Brackenridge (A5); Granite City (G2); Indiana Harbor (I3); Mansfield (E2); Newport, Ky. (N5); Niles, O. (N3); Vandergrift (U1); Warren, O. (R3); Zanesville (A7). (2¢ higher, HR)

## MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails		Woven Wire Fence 3-15/2 in.	1/2" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	March. Wire Amt'd	March. Wire Galv.
	Cal	Cal	Cal	Cal	Cal	Cal	Cal	Cal
Alabama City R3	167	181	195	187	8.10	8.50	—	—
Aliquippa, Pa. J3	167	184	184	8.10	8.65	—	—	—
Atlanta A8	169	187	197	193	8.20	8.80	—	—
Bartonsville K2*	169	187	197	193	8.20	8.80	—	—
Buffalo, W5	—	—	—	—	8.10	8.50	—	—
Chicago, Ill. N4**	167	185	167	191	8.10	8.70	—	—
Cleveland A6	173	—	—	—	8.10	—	—	—
Crawfordsville M4*	169	187	197	193	8.20	8.80	—	—
Denera, Pa. A5	167	181	195	187	8.10	8.50	—	—
Duluth A5	167	181	195	187	8.10	8.50	—	—
Fairfield, Ala. T2	167	181	195	187	8.10	8.50	—	—
Galveston D4	167	—	—	—	—	—	—	—
Houston S2	172	186	192	192	8.35	8.75	—	—
Johnstown, Pa. B3*	167	185	167	191	8.10	8.70	—	—
Jeliot, Ill. A5	167	181	195	189	8.10	8.50	—	—
Kokomo, Ind. C9	160	183	197	189	8.20	8.60	—	—
Los Angeles B2*	—	—	—	—	9.05	9.65	—	—
Kansas City S2	172	186	200	192	8.35	8.75	—	—
Minneapolis C6	172	186*	172	200	8.35	8.75	—	—
Monessen P6	167	185	—	—	9.10	9.10	8.10	—
Pittsburg, Cal. C7	186	204	—	—	207	9.95	9.45	—
Portsmouth P7	—	—	—	—	—	—	—	—
Rankin, Pa. A5	167	181	—	—	8.10	8.50	—	—
So. Chicago R3	167	181	195	187	8.10	8.50	—	—
S. San Francisco C6	—	—	219	—	8.05	9.45	—	—
Sparrows Pt. B3*	—	—	197	193	8.20	8.80	—	—
Struthers, O. Y1	—	—	193	—	8.10	8.60	—	—
Worcester A5	173	—	—	—	8.40	8.80	—	—
Williamsport, Pa. S3	—	—	175	—	—	—	—	—

Galvanized products computed with zinc at 5¢ per lb. Exceptions: \* zinc at 12.5¢ per lb; \*\* 13 1/2¢ zinc.

† Wholesalers only.

## C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.26	0.41	0.61	0.81	1.06
0.40	0.60	0.80	1.05	1.35	—
Baltimore, Md. T3	8.25	10.10	12.90	15.30	18.25
Bristol, Conn. W12	—	—	12.90	15.30	18.25
Boston T3	8.50	10.10	12.90	15.30	18.25
Buffalo, N. Y. R7	7.95	9.80	12.60	15.00	17.95
Carnegie, Pa. S9	—	9.80	12.60	15.00	—
Cleveland A5	7.95	9.50	12.60	15.00	17.95
Detroit D1	8.05	9.90	12.70	15.10	—
Detroit D2	—	—	—	—	—
Franklin Park, Ill. T8	8.05	9.50	12.60	15.00	17.95
Harrison, N. J. C11	—	—	12.90	15.30	18.25
Indianapolis C5	8.10	9.95	12.60	15.00	17.95
New Castle, Pa. B4	7.95	9.50	12.60	15.00	—
New Haven, Conn. D1	8.40	10.10	12.90	15.30	—
Pawtucket, R. I. N7	8.50	10.10	12.90	15.30	18.25
Pittsburgh S7	7.95	9.80	12.60	15.00	17.95
Riverside, Ill. A1	8.05	9.80	12.60	15.00	17.95
Sharon, Pa. S1	8.05	9.90	12.70	15.10	—
Trenton R4	—	10.10	12.90	15.30	18.25
Wallingford W1	8.40	10.10	12.90	15.30	18.15
Warren, Ohio T4	7.95	9.80	12.60	15.00	17.95
Worthington, W. Va. W3	7.95	9.80	12.60	15.00	17.95
Worcester, Mass. A5	8.50	10.10	12.90	15.30	18.25
Youngstown C5	7.95	9.80	12.60	15.00	17.95

‡ On Application.

## BOILER TUBES

F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD- In.	B.W. Ga.	H.R.	C.D.	H.R.	C.D.
Babcock & Wilcox	2	13	34.88	40.85	33.21	—
	2 1/2	12	46.95	55.01	44.73	—
	3	12	54.24	63.53	51.66	—
	3 1/2	11	63.32	74.16	60.30	—
	4	10	84.09	98.47	80.07	—
National Tube	2	13	34.88	40.85	33.21	—
	2 1/2	12	46.95	55.01	44.73	—
	3	12	54.24	63.53	51.66	—
	3 1/2	11	63.32	74.16	60.30	—
	4	10	84.09	98.47	80.07	—
Pittsburgh Steel	2	13	34.88	40.85	33.21	—
	2 1/2	12	46.95	55.01	44.73	—
	3	12	54.24	63.53	51.66	—
	3 1/2	11	63.32	74.16	60.30	—
	4	10	84.09	98.47	80.07	—

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets for quantity.

\*\* F.O.B. Plant, warehouse price.

† 16 gage. ‡ Deduct for country delivery.

(Effective Sept. 4, 1956)

## RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Untreated
Bessemer UI, So. Chicago R3	5.075	6.00	6.35	6.775			
Endsley T2	5.075	6.00		6.775	6.025		
Fairfield T2		6.00		6.775	6.025		
Gary UI	5.075	6.00	6.35	6.775	6.025		
Ind. Harbor I3	5.075		6.35	6.775	6.025		
Ind. Harbor V1		6.00		6.775			
Johnstown B3	5.075	6.35					
Joint UI	5.075	6.35					
Kansas City S2		6.35		6.775			
Lackawanna B3	5.075	6.00	6.35		6.025		
Lakehorne B3		6.00					
Minnequa C6	5.075	6.50	6.35	6.775	6.025	13.10	
Pittsburgh P5		6.775		12.85			
Pittsburgh J3			6.775			13.10	
Seattle B2			9.275		6.35	16.60	
Steelton B3	5.075	6.35			6.175	13.60	
Struthers Y1			8.775				
Torrance C7							
Williamsport S5	6.15			8.775			
Youngstown R3							

## COKE

Furnace, beehive (f.o.b. oven)	Net-Ton
Connellsville, Pa.	\$14.50 to \$14.75
Foundry, beehive (f.o.b. oven)	
	\$17.00 to \$18.00
Foundry, oven coke	
Buffalo, del'd	\$30.75
Detroit, f.o.b.	29.50
New England, del'd	30.55
Seaboard, N. J., f.o.b.	28.75
Philadelphia, f.o.b.	28.50
Swedenland, Pa., f.o.b.	28.50
Painesville, Ohio, f.o.b.	29.50
Erie, Pa., f.o.b.	29.50
Cleveland, del'd	31.55
Cincinnati, del'd	28.59
St. Paul, f.o.b.	28.50
St. Louis, f.o.b.	30.50
Birmingham, f.o.b.	27.60
Milwaukee, f.o.b.	29.50

## ELECTRODES

Cents per lb f.o.b. plant, threaded, with nipples, unbored.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	64	23.00	40	100,110	9.90
20	72	22.25	35	110	9.90
16 to 18	72	22.50	30	110	10.05
14	72	23.00	24	72 to 84	10.30
12	72	23.50	20	90	10.10
10	60	24.75	17	72	10.35
7	60	24.50	14	72	10.85
5	60	27.25	12	60	11.75
4	40	30.25	10	60	11.80
3	40	32.00	8	60	12.10
2 1/2	30	33.75			
2	24	52.50			

\* Prices shown cover carbon nipples.

## ELECTROPLATING SUPPLIES

### Anodes

(Cents per lb, f.o.b. shipping point)

Copper	Cast elliptical, 18 in. or longer	62.92
	5000 lb lots	50.28
	Electrodeposited	
	Brass, 80-20, ball anodes, 2000 lb or more	60.00
Zinc, ball anodes, 2000 lb lots	21.25	
(for elliptical add 2¢ per lb)		
Nickel, 99 per cent plus, rolled carbon	90.50	
(rolled depolarized add 3¢ per lb)		
Cadmium		31.70
Tin, ball anodes and elliptical	\$1.00 to \$1.10	

### Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drums	30.50
(Philadelphia price 22.60)	
Zinc cyanide, 100 to 900 lb	55.55
Potassium cyanide, 100 lb drum	
N. Y.	48.00
Chromic acid, flake type, 1 to 20	
100 lb drums	29.25

## BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct Discounts

Machine and Carriage Bolts	Full Container Price	30 Containers	20,000 Lb.	40,000 Lb.
3/8" and smaller x 6"	55	58 1/2	60 1/2	61 1/2
3/8" thru 1" longer than 6"	46 1/2	50	52 1/2	54
Rolled thread carriage bolts 1/2" & smaller x 6" in. and shorter	55	58 1/2	60 1/2	61 1/2
Lag, all diam. x 6" & shorter	55	58	60	61
Lag, all diam. longer than 6"	47	50	52	53
Plow bolts, 1/2" and smaller x 6" and shorter than 6"	54	57 1/2	59	60

(Add 25 pct for broken case quantities)

### Nuts, Hex, HP reg. & hvy.

Full Case or Keg Price

5/8" in. or smaller	63
5/8" in. to 1 1/2 in. inclusive	59 1/2
1 1/2" in. to 1 1/4 in. inclusive	64
1 1/4" in. and larger	58

### C.P. Hex regular & hvy.

5/8" in. and smaller

5/8" in. to 1 1/2 in. inclusive

1 1/2" in. and larger

(Add 25 pct for broken case or keg quantities)

### Hot Galv. Nuts (All Types)

5/8" in. and smaller

# Ferroalloy Prices

(Effective Sept. 4, 1956)

## Ferrochrome

Contract prices, cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71%
Cr. .30-1.00% max. Si. 39.25 0.20% C 36.25
0.02% C 38.75 0.50% C 36.90
0.03% C 37.25 1.00% C 35.25
0.06% C 36.75 1.50% C 35.19
0.10% C 36.50 2.00% C 35.09
4.00-4.50% C, 67.70% Cr, 1-2% Si. 26.25
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si. 25.00
0.025% C (Simplex) 32.50
0.10% C, 50-52% Cr, 2% max Si. 33.75
8.50% max. C, 50-55% Cr, 3-6% Si. 22.50
8.50% C, 50-55% Cr, 3% max Si. 22.50

## High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% of N.

## Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.
0.10% max. C 1.27
0.50% max. C 1.27
9 to 11% C, 33-91% Cr, 0.75% Fe. 1.36

## Electrolytic Chromium Metal

Contract prices per lb of metal 2" x D plate (1/8" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max. Carloads
Carloads 1.25
Ton lots 1.27
Less ton lots 1.29

## Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-45%, C 0.05% max.) Contract price, carloads, delivered, lump, 3-in. x down, per lb of Cr, packed. Carloads 41.85
Ton lots 46.15
Less ton lots 48.65

## Calcium-Silicon

Contract price per lb of alloy, lump, delivered, packed. 30-33% Cr, 60-65% Si, 3.00 max. Fe. Carloads 23.00
Ton lots 26.75
Less ton lots 28.25

## Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy, lump, delivered, packed. 16-20% Ca, 14-18% Mn, 53-59% Si. Carloads 23.05
Ton lots 24.95
Less ton lots 25.95

## SMZ

Contract prices, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/2 in. x 12 mesh. Ton lots 19.65
Less ton lots 20.90

## V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed. Carload lots 17.20
Ton lots 18.70
Less ton lots 19.95

## Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11% Ca 5 to 7%. Carload packed 18.50
Ton lots to carload packed 19.65
Less ton lots 20.90

## Ferromanganese

Producing Point per-lb
Marietta, Ashtabula, O.; Marietta, W. Va.; Sheffield, Ala.; Portland, Ore. 10.75
Johnstown, Pa. 10.75
Sheridan, Pa. 10.75
Philo, Ohio 10.75
S. Duquesne 10.75
Add or subtract 0.1¢ for each 1 pct Mn above or below base content. Briquets, delivered, 66 pct Mn: Carloads, bulk 13.00
Ton lots packed 15.20

## Spiegeleisen

Contract prices, per gross ton, lump, f.o.b. Palmerton, Pa.
Manganese Silicon
16 to 19% 3% max. 94.00
19 to 21% 3% max. 96.00
21 to 23% 3% max. 98.50

## Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered. 95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.
Carload, packed 45.75
Ton lots 47.25

## Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.
Carloads 31.5
Ton lots 33.5
250 to 1999 lb 35.5
Premium for hydrogen-removed metal 0.75

## Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn. 22.85
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## Low-Carb Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.
Carloads Ton Less

0.07% max. C, 0.06% P, 90% Mn 34.00 36.55 37.75
0.07% max. C 31.95 34.50 35.70
0.10% max. C 31.20 33.75 34.95
0.15% max. C 30.45 33.00 34.20
0.30% max. C 28.95 31.50 32.70
0.50% max. C 28.45 31.00 32.20
0.75% max. C, 80.85% Si 25.45 28.00 29.20

## Silicromanganese

Contract basis, lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.
Carloads bulk 12.00
Ton lots 13.45
Briquet contract basis carloads, bulk, delivered, per lb of briquet 13.55
Ton lots, packed 15.75

## Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$100.00 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.
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## Silicon Metal

Contract price, cents per pound Si, lump size, delivered, packed.
Ton lots Carloads
96.50% Si, 2% Fe 22.75 21.45
98% Si, 1% Fe 23.25 20.50

## Silicon Briquets

Contract price, cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.
Carloads, bulk 7.15
Ton lots, packed 9.75

## Electric Ferrosilicon

Contract price, cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.
50% Si 12.75 75% Si 15.40
65% Si 14.50 85% Si 17.10
90% Si 18.50

## Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.
Cast Turnings Distilled
\$2.05 \$2.95 \$3.75
Ton lots 2.40 3.30 4.55

## Ferrovanadium

50-55% V contract basis, delivered, per pound, contained V, carloads, packed.
Openhearth 3.19
Crucible 3.20
High speed steel (Primos) 3.30

## Alisifer, 20% Al, 40% Si, 40% Fe, Contract basis, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads 10.65¢
Ton lots 11.80¢

## Calcium molybdate, 43.6-46.6% f.o.b. Langeloeth, Pa., per pound

Contained Mo. \$1.28
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## Ferrocolumbium, 50-60%, 2 in. x D contract basis, delivered per pound contained Crb.

Ton lots \$6.90
Less ton lots 6.95

## Ferro-tantalum-columbium, 20% Ta, 40% Cr, 0.30% C, contract basis, del'd, ton lots, 2-in. x D per lb cont'd Sb plus Ta.

\$4.65
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## Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langeloeth, Pa., per pound contained Mo.

\$1.54
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## Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$4.00 unitage, per gross ton

10 tons to less carload \$90.00
10 tons to less carload 110.00

## Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti.

\$1.50
Less ton lots 1.55

## Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carloads, per net ton

\$200.00
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## Ferrotungsten, 1/2 x down, packed, per pound contained W, ton lots, delivered

\$3.45
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## Molybdenum oxide, briquets, per lb contained Mo, f.o.b. Langeloeth, Pa.

\$1.32
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## Simnall, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per lb.

17.50¢
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## Ton lots, packed lump 19.50¢

20.00¢
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## Vanadium oxide, 86-89% V<sub>2</sub>O<sub>5</sub>, contract basis, per pound contained V<sub>2</sub>O<sub>5</sub>

\$1.33
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## Zirconium contract basis, per lb of alloy

35-40% f.o.b. freight allowed, carloads, packed
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26.25¢
--------

# RAILWAY EQUIPMENT FOR SALE

Used - As Is - Reconditioned

## RAILWAY CARS

All Types

## SERVICE-TESTED ®

## FREIGHT CAR REPAIR PARTS

For All Types of Cars

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Diesel, Steam, Gasoline,  
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40 and 50-ton capacity

Excellent condition. Immediate delivery!

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**"ANYTHING containing IRON  
or STEEL"**

## THE CLEARING HOUSE

### News of Used and Rebuilt Machinery

**Rebound Comes . . .** An early fall climb in sales of used machine tools is no news. Chicago area dealers had been expecting it for weeks, even during the temporary slowdown in early July. And despite the steel strike, despite steel shortages that have cutback production in several major plants in the area, despite the automotive slowdown for change-over, despite a number of plant layoffs in the farm equipment industry—used tool sales are rebounding as predicted.

Dealer stocks are low. Prices are beginning to creep up again after holding steady through July and early August or even moving down slightly in one or two types of tools. Auction prices never faltered during the entire period, and appear to be again moving up in the face of strong consumer resistance.

**Rebuilder Backlogs . . .** Backlogs of work at the rebuilder level are currently strong enough to carry through into late fourth quarter, and new business is again expanding these backlogs. Reports of a temporary cutback in incoming volume for machine tool rebuilders seem to have been due largely to the inability of the tool owner to pull the machines out of his own production lines. The orders are still pieced and are now being reinforced with a host of new orders. One small rebuilder will be tied up, for instance, for at least 60 days with orders on the floor, and his order book is again beginning to fill with work for late fourth quarter delivery.

**Toolroom Sales Up . . .** Small shops have always been a sensitive weathervane for business ahead and here business levels appear to have advanced substantially in August over July levels. This is true even in shops which

had been having a mild business slowdown since June. Toolroom equipment still hasn't rebounded to the extent that general purpose production line equipment has gained, but is confidently expected to move up with equal strength in the near future. At the moment, however, even toolroom equipment has shown substantial gains.

**Best Seller List . . .** Drills and lathes and millers are running strongly and are certainly not easy to obtain, but small used tool sellers report they are actually turning away some sheet metal forming equipment business simply because they can't fill the order in the time specified. Customers are cagey on price, but having decided to buy, are out for fast delivery or the business goes somewhere else. The press, press-brake business seems to be coming not only from sheet metal fabricators but light plate consumers as well, despite the fact that they haven't much raw material to work.

Screw machines, and some of the bar finishing equipment, slowed early this year after a red-hot first quarter demand. This type of equipment now seems to be sharing in the general pickup.

**Tightening Increases . . .** One thing is certain. With an extremely strong fourth quarter shaping up, used tool men are going into it with considerably less inventory in hand than was the case one year ago. If early 1956 was a tight used tool market, late 1956, on the basis of the signs thus far, will be much tighter. A few tool men are admitting that, like it or not, they expect to have increasing difficulty in filling orders, and will probably have to pay stiffer prices for the tools they buy for resale.

# CONSIDER GOOD USED EQUIPMENT FIRST

## BENDING ROLLS

10' x 2/16" Niagara Initial Type  
10' x 2" Ga. Bertsch Initial Type  
12' x 2" 1/2" Nickelback Pyramid Type  
16' x 2" 1/2" Nickel Pyramid Type

## BRAKES—LEAF TYPE

10' x 16" Ga. Dresl & Krump Hand Operated  
12' x 16" Ga. Dresl & Krump  
12' x 16" Dresl & Krump Motor Driven

## BRACKETS—PILES TYPE

8' x 2" 1/2" Cincinnati  
10' x 2" Superior Hydraulic, NEW  
12' x 2" Superior Hydraulic, NEW

## CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton P.A.H. 29' Span 230 Volt D.C.  
5 ton Shepard Niles 55' Span 220 Volt D.C.  
5 ton Shepard Niles 55' Span 220 Volt D.C.  
10 ton Clegg 40' Span 230 Volt D.C.  
10 ton P.A.H. 60' Span 230 Volt D.C.  
15 ton P.A.H. 40' Span 230 Volt D.C.  
20 ton Toledo 75' Span 550/3/60 A.C.  
25 ton L-B 60' Span 440/3/60 A.C.

With 5-ton Auxiliary

25 ton L-B 75' Span 220/3/60 A.C.  
10 ton 300 ft. Runway

80 ton Niles 75' Span 230 Volt D.C.

2-40-ton Trolleys & 5-ton Auxiliary

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2-50-ton Trolleys & 10-ton Auxiliary

3-50-ton long 8' wide, Fully Machined

## FORGING MACHINES

2" Ajax, Air Clutch

1" to 5" Ace, Ajax, National

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800 & 2000# Chambersburg J-2

1000, 1200, 2500# Chambersburg

1600# Billings & Spencer

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## HAMMERS—STEAM FORGING

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1000, 1100, 1500, 5000, 12,000# Erie

31 Ton Hammer—New 1942

## JIG BORING MACHINES

SIP Hydroptic No. 6 Jig Boring Machine, Table 33" x 42", Complete set tools & fixtures

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60" United 17 Rolls 3 1/2" Dia.

72" McKay 17 Rolls 4 1/2" Dia.

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84" McKay 17 Rolls 4 1/2" Dia.

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50 ton Clegg 14' x 15' 40" x 24" Strokes, Bed 36x12"

600 ton Southward 16" Strokes, Bed 60x12"

750 ton Elmes 5" Stroke, Platen 30 1/2" x 32"

800 ton Clearing 45" Stroke, Bed 48x48"

1000 ton Lake Erie Dble Acting, 48" Strokes, Bed

Area & Platen 72 x 14"

## PRESSES—STRAIGHT SIDE

Clearing Model TPI 41500-200 Triple Acting Strokes 40, 52, 140, 160, 180, 200

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Style EF Clegg 50" throat, Punch 1 1/2" thru 1"

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Pels Luseff, Punch 1 1/2" x 1" Shear Angle 6 x 6 x

5/8" Rd. 2 1/2", Sq. 2 1/2", etc.

## ROLLING MILLS

10" x 16" Single Stand, Two High

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12" x 20" G & M Single Stand, Two High

16" x 24" Farrel Two Stand, Two High

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**ELECTRIC POWER EQUIPMENT**  
A. C. MOTORS  
3 phase—60 cycle

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Qu. H.P. Maks. Type Volts Speed

1 1500 G.E. MT 6900 1187

1 1100 G.E. IM 2300 730

1 1000 A.C. M111 2300 240

1 800 G.E. 2300 223

1 750 G.E. MT-573 2200 1190

1 700 A.C. 2300 560

1 500 Whee. CW 550 350

1 400 Whee. CW-860A 440 1170

1 400 Whee. CW-860B 440 514

1 400 Whee. CW-1212 2300 435

1 350 G.E. IM-17A 440/2300 730

1 250 G.E. MT-424Y 4000 257

1 250 G.E. MT-559B 2200 1800

1 250 AL Ch. 550 660

1 200 Cr. Wh. 20QB 440 505

1 200 G.E. IM 440 425

1 200 G.E. IM 2300 560

1 150 (unused) Whee. CW 2300 435

2 125 A.C. 440 865

1 125 AL Ch. 440 720

1 100 G.E. IM-16 2200 435

1 100 G.E. IM 440 660

4 100 A.D. 11 NY 440 695

## SQUIRREL CAGE

Qu. H.P. Maks. Type Volts RPM

1 800 G.E. KT-573 2200 1180

2 650 G.E. FT-559BT 440 3570

2 450 Whee. CS-1420 2300/4150 354

1 400 G.E. IE-15B 2200 1165

1 400 G.E. IM 2200 560

1 200 G.E. IK-17 2200 560

1 200 G.E. IK-53T 440 1800

1 200 G.E. IK 440/2000/4500 1800

1 150/75 G.E. IK 440/900/4500

1 150 Whee. CS8558 440 880

1 150 Whee. CB 440 580

2 125 AL Ch. ARW 2200 1730

## SYNCHRONOUS

Qu. H.P. Maks. Type Volts RPM

1 700 G.E. ATI 2200/6000 660

1 4350 C.W. 3501SL4000/5000/13800 514

1 2850 Whee. S.p.f. 2300/4600 514

1 2800 Whee. S.p.f. 2300 720

2 2000 Whee. 2300 120

2 1750 G.E. ATI 2200/12000 660

1 735 G.E. ATI 2200/12000 660

2 500 G.E. TS-7567 2200 1200

1 450 Whee. TS-7567 2200 124.5

1 450 Whee. 2200 450

1 400 G.E. TS-7565 2200 1200

1 355 G.E. ATI 440 1800

1 225 G.E. ATI 440 1800

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## ENGINE LATHE

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20" x 60" Two High Breakdown Mill

22" x 12" x 40" Lewis 3-High Shut Mill

44" x 28" x 44" x 144 Three High

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90" x 1 1/2" Williams & White

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8" x 1 1/2" Niagara L-8

10" x 1 1/2" Cincinnati, LATE

12" x 3/16" Niagara L-12

12" x 1 1/2" Steelwood LATE

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12" Blake & Johnson

40" Yoder Slitting Line

40" Yoder Gang Slitter, 5" Threaded Arbor

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Kane & Roach 2 Roll Rotary Straightener, M.D.

Capacity Mildsteel 1/2" to 7/8"

Kane & Roach 5 Roll #5250-B, Capacity 1/2"

solid, 4 1/2" Tube

Austin Standard 12 Roll Straightener, Capacity 1"

## SWAGING MACHINE

20" x 1/2" Fomec 2" Tube, 2 1/2" Solid 10".

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60,000, 100,000, 200,000 Olsen & Riehle Universal

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Chain Link Wire Weaving Machine, Wth Butt Welder, 39 & 51 Ga. Wire up to 12" Height

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72" Hanchett 3-sp. rotary surface, new 1940.

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16" x 36" Landis type C hyd. pl. cylindrical, 1942.

6" x 36" Cincinnati EA Filmatic pl. cylindrical, 1942.

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No. 3 C Chambersburg pneumatic, serial No. 2207.

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No. 6B Nazel, self-contained.

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No. 3 Gisholt Univ. Turret Lathes (2), 1942.

10" x 16" Standard Turret, 1940.

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36" Rockford Hyd. Open-side Shaper-Planer.

42" x 42" x 12" Liberty dbl. housing planer, 35 HP M.D.

48" x 48" x 10" Gray Maxi-Servies.

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90 ton No. 921/C Toledo D.C. Str. Side.

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500 ton No. 1000 Hamillett D.C. adj. hid. 60" x 102".

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24" Rockford Hyd. Dr. Universal.

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36" Rockford Open-side hyd. shaper-planer, ser. 38H U.S.

36" Rockford hyd. vertical slotter, new 1944.

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1/2" National Upsetter, guided ram, hard ways.

2" National Upsetter, guided ram, air clutch.

3/4" Ajax suspended slides, steel frame.

4" National high duty, susp. & guided rams.

7/8" National Upsetter, air clutch, new 1944.

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## Free Illustrated Catalog

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20" x 30" United 2Hi Cold Mill, Roller Bgs.

Suitable for Precision Experimental work.

17 Roll backed up leveler, 3" x 30" Fessier.

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24" Mattison 464 Strin Gr & Pol. 30 HP AC.

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# ROLLING MILLS—STEEL WORKS EQUIPMENT

1—34" & 22" x 112" 3-HIGH PLATE MILL with front and back tilting tables. 1500 HP motor and gear set; also 84" 3-high mill.  
 1—30" x 97" BLOOMING OR SLAB MILL, 2-HIGH reversing.  
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 1—34" x 102" ROLL GRINDER with motors and controls.  
 2—ROLLER LEVELERS, McKay, rolls 80" face x 5½" dia., with gear box and universal spindles.

1—PICKLING MACHINE for sheets, Taylor design.  
 1—34" ROLL LATHE, enclosed headstock, 25 HP, 400/1200 RPM D.C. motor and controls.

1—30" ROLL LATHE, enclosed headstock, 25 HP, 400/1200 RPM D.C. motor.

2—PACK FURNACES for hot sheet mills, 62" x 80", double chamber.

1—AJAX electric induction melting furnaces, 2000 lbs. each.

1—3-TON ELECTROMELT electric melting furnace, good condition.

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1—UNITED #4 vertical open side bar shear.

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1—SHEET SQUARING SHEAR, Mesta, 7½" x 150".

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#### MOTOR GENERATOR SETS

Qu.	KW	Maks	D.C.	A.C.
			R.P.M.	Volts
1	2500	Whse.	720	600
1	2000	Al. Ch.	720	250
1	1290	Whse.	720	600
1	1120	Elliott	720	250/280
1	1000	G.E.	1200	250/275
1	580	Ch. Wa.	720	575/600
1	390	G.E.	1200	250/275
1	290	Elliott	1200	125
1	150	G.E.	1200	250
1	120	Whse.	1200	250
1	100	Al. Ch.	1200	250

#### DIRECT CURRENT MOTORS

Qu. H.P.	Make	Type	Volts	R.P.M.
2	3000	Whse.	Mill	525
6	1500	Whse.	Mill	525
4	700	Whse.	Mill	250
2	600	Al. Ch.	Mill	600
6	600	Whse.	Mill	230
2	500	Whse.	Mill	230
1	500	Whse.	Mill	230
1	350	G.E.	CD-100	1150
1	300	Whse.	Mill	230
4	275	Whse.	QM	230
1	200/250	El. Dry.	Ped. Brdg.	230
1	200	Whse.	SK-210	230
1	180	G.E.	MPC	230
1	125	Whse.	SK-201	330
1	125	Whse.	SK-184	330
1	125	G.E.	MPC	230
1	100	El. Dry.	30-S	230
2	100	El. Dry.	30-S	230
1	80	Reliance	651-T	230
1	60/80	El. Dry.	258	230
1	40	G.E.	(D-122	230
1	40	Whse.	SK-150	500/1000
1	32½	Whse.	SK-150	500/1700
2	25	Whse.	SK-92	230
1	20	Cr. Wh.	D. P. B. B.	1150/2400
1	26	Whse.	SK-123	400/1200
1	15	G.E.	CD-85	230
3	15	Whse.	SK-100L	500/1500
1	15	Reliance	155-T	230
1	10	Whse.	SK-103	400/1600
1	10	Al. Ch.	P-200	230
4	10	Whse.	SK-91	230
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1	7½	G.E.	CD-65	230
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### FOR SALE HEAVY WALL SEAMLESS TUBING 1025-1045 CARBON

FOOTAGE	OD	WALL	LENGTHS
80'	6½"	1.150	25-28'
2600'	6.050"	.450-.510	16-24'
1800'	6.050"	.500	18-21'
100'	6½"	.875	18-21'
1368'	7"	.500-.550	35-40'
400'	7.390"	.400	18-21'
780'	7½"	.500	38-40'
180'	7.656"	.565-.575	16-21'
3400'	8½"	.460	25-32'
540'	8½"	.500	28-33'
372'	8½"	.718	25-35'
85'	8½"	.750	16-18'
1325'	8½"	.875-.900	26-30'
1890'	8½"	.906	26-32'
38'	8½"	.950/1.000	18-20'
175'	8½"	1.375	24-26'
1781'	9½"	.750	18-40'
516'	10½"	.450	16-40'
450'	11½"	.750/.800	16-20'
2094'	11½"	.750/.800	16-40'
725'	11½"	1.150/1.200	10-25'
452'	11½"	1.450/1.500	16-25'
254'	11½"	1.700/1.800	16-26'
448'	11½"	1.750/1.800	16-25'
126'	11½"	2.100/2.200	16-20'
246'	11½"	.625	6'
136'	12½"	1.000	20-30'
150'	12½"	1.312	12-24'
156'	14"	.500	34-44'
76'	14"	1.125	10-23'
278'	14"	2.100/2.200	16-20'
203'	14"	2.600	10-20'
38'	14½"	.875	18-20'
15.6'	36"	1.800	15.6'
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Other Sizes Not Listed Available for Immediate Shipment from Stock Priced Right.

ADDRESS BOX G-405  
Care The Iron Age, Chestnut & 56th Sts., Phila. 39

### TURBO-GENERATORS for stand-by use

(3) units available—300 KW—120/240 volts DC—1250 amps.—Allis Chalmers—driven by Allis Chalmers geared turbines—190 lbs. 475° T.T. This is a marine turbo-generator that operates condensing. "Like-New" condition.

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### THE BOSTON METALS CO.

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BALTIMORE 2, MD.—LE. 9-1900

### SQUIRREL CAGE MOTOR

3 Phase, 60 Cycles, 220 or 440 volts  
(\*230 Volts or higher)

HP	Make	Type	Speed
1250	"Al. Ch.	ANX	3400
1200	"Al.Ch.	ARW	1200
750	"Westg.	CB	900
500	"Al. Ch.	ARW	2400
500	G.E.	KT5698	900
450	G.E.	KT-424	450
400	G.E.	KT-124	720
300	G.E.	KT-6352 TEFU	720
250	Westg.	CS-TEFU	1800
250	G.E.	KT-559	1800
250	"L. Allis.	CEX-148	720
250	G.E.	IR	600
250	G.E.	IK-17A	600
250	Westg.	CS-14	514
200	G.E.	FT-549Y	3600
200	G.E.	IK-13B	1800
200	Al. Ch.	AR	1200
200	G.E.	KT564	900

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Very high grade, well located, surface mining, vast tonnage, best of geological reports, write for full information, to

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### IMMEDIATE SHIPMENT

1,000 tons new 100# Rails with new Joint Bars to match. Will quote an attractive price.

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481 Park Blvd., Fifth Avenue, Pittsburgh, Pa.

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No. 2 Press-Rite Presses, dial feed, air clutch.

No. 2 Press-Rite Presses with air clutch.

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Fellows Straight Line Gear Generators.

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# LIQUIDATING

## MACHINERY—ROLLING MILL EQUIPMENT

# Gary Armor Plate Plant

### MORGAN 84" THREE HIGH UNIVERSAL MILL

Completely Rebuilt, 1943

Rolls 36" x 24" x 36"

Tilting Tables

500 Foot Runout Table

Cooling Beds

### WEAN ROLLER TABLES

Purchased New—Condition New!

Four—45' Sections

230 Volt D.C. Motorized, Totally Enclosed Chain  
Drive 10½" Face by 72" Wide Set On 15" Centers

### PANGBORN SAND BLAST

Two Type R.F. Full Mechanical Abrasive Handling  
System for Roto-Blasting Plates on Two Sides Simul-  
taneously—Cabinet Size 9' Wide 13' Long, 5' 3"  
above Floor  
Capacity Plates 6' W 20 L x ½" to 4" Thick, Work  
Travels 4' to 6' Per Minute

### MCKAY BACKED UP ROLLER LEVELER

Purchased New—Condition New!

15" Diameter, 90" Face

9 Backed Up Rolls

Leveling Rolls 15" x 90"

Motorized Screw Down

Speed of Unit—33 to 66 R.P.M.

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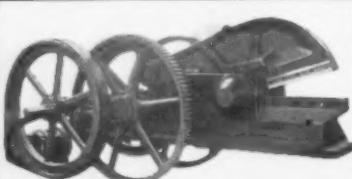
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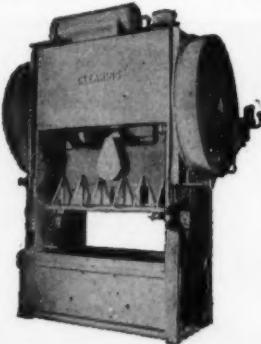
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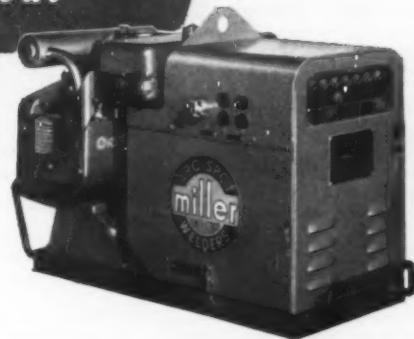
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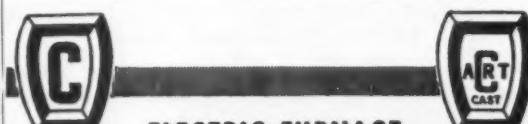
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## METALWORKING BRIEFS

## ICC Stays Freight Car Demurrage Hike

Industrial shippers are being spared, temporarily, the payment of higher rates on freight car use. The Interstate Commerce Commission suspended for seven months the new demurrage increase demanded by railroad carriers. The proposals would have boosted the rates \$1 to \$4 per day after the first 48 hours.

### Industrial Supplies Index Dips

Orders for production supplies and equipment placed by industrial distributors with their manufacturing suppliers were slightly lower in July than in the five preceding months. The new order index, compiled by American Supply & Machinery Manufacturers' Assn. was 195.6 in July compared to 197.8 in June, and the high for the year of 208.6 in April.

## Cement Price Rise Hits Builders

Construction costs are going higher for the fourth quarter, but this time the hike can be attributed to the cement industry. Lehigh Portland Cement Co. raised its cement prices 15 cents a barrel to \$3.20 at six of its 14 mills. Hercules plans a similar boost and others may follow.

## Three Giant Tankers For Newport News

An estimated \$45 million contract for construction of three 60,000-ton tankers was received by Newport News Shipbuilding & Drydock Co. from the newly-formed Barracuda Tanker Corp. Delivery will be between the fall of 1958 and spring, 1959.

## Electric Motor Repair Costs Up

A 10 pct increase for repairing and reconditioning most classes of motors up to 499 hp and distribution transformers below 167 kv amps was announced by General Electric Co. on behalf of its nationwide chain of repair shops.

## Gas Outstrips Oil In Home Heating

Gas has inched out oil as the leading home heating fuel, according to the American Gas Assn. Homes now using gas central heating units total 10.2 million, compared to 10.1 million with oil. Coal accounts for 7.5 million.

## New Billet and Slab Mill For Chicago

Acme Steel stockholders learned late last week that the Chicago strip producer, which recently announced plans for purchase of Newport Steel, will now expand in the Chicago area. Installation will cost an estimated \$15 million. Production: 17,000 tons per month.

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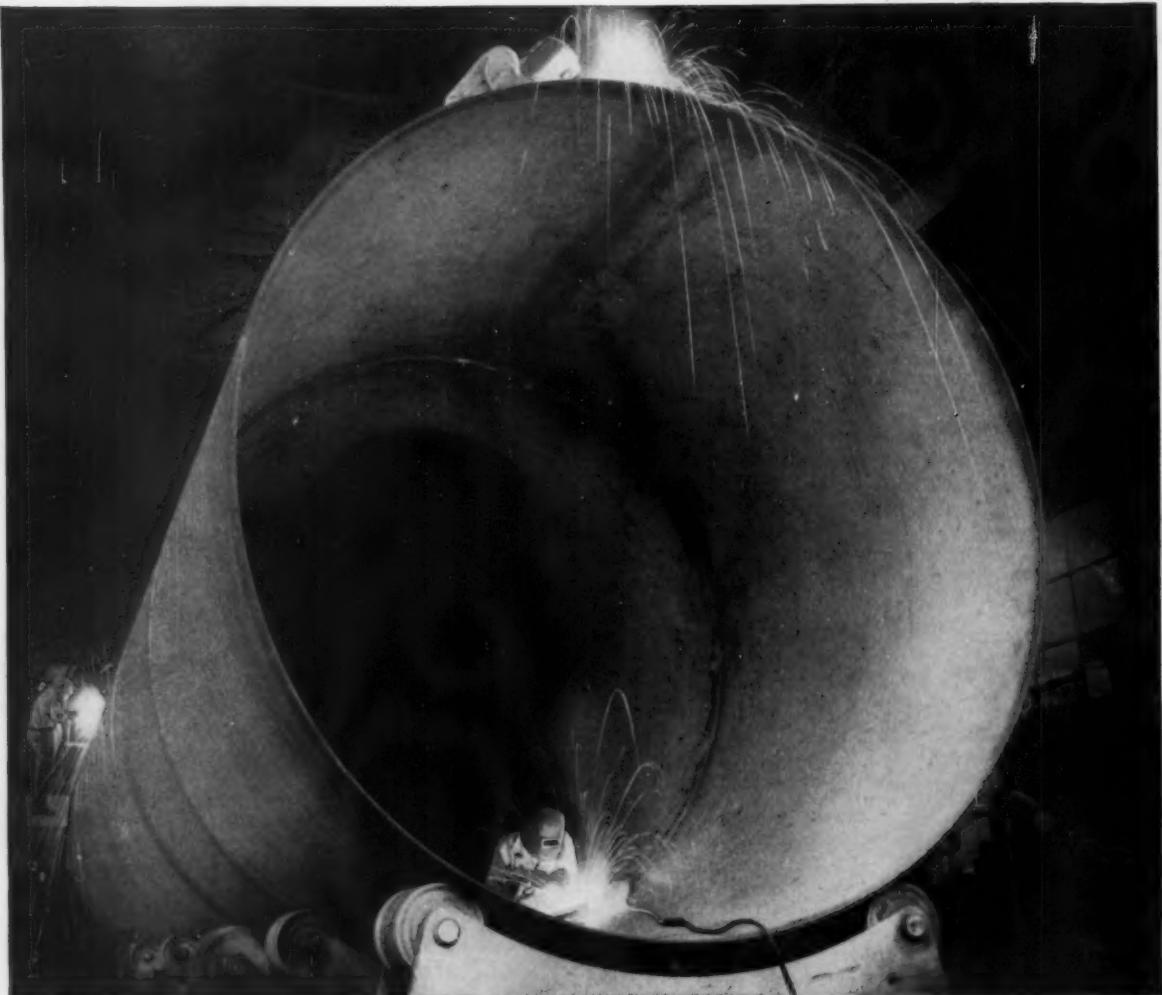
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Delaware, for a government aircraft development project. Each of the vessels is fabricated entirely of Lukens "T-1" steel.

Fabricator of giant air accumulator says:

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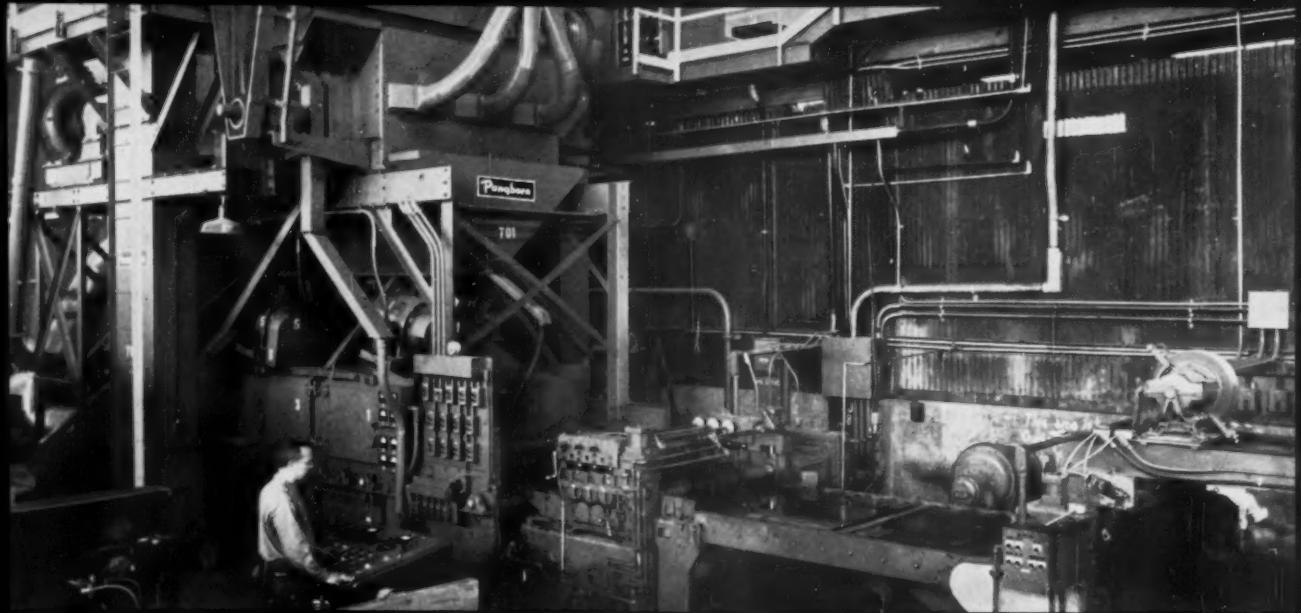
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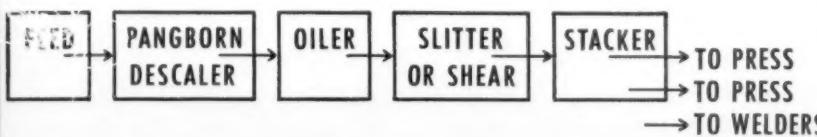
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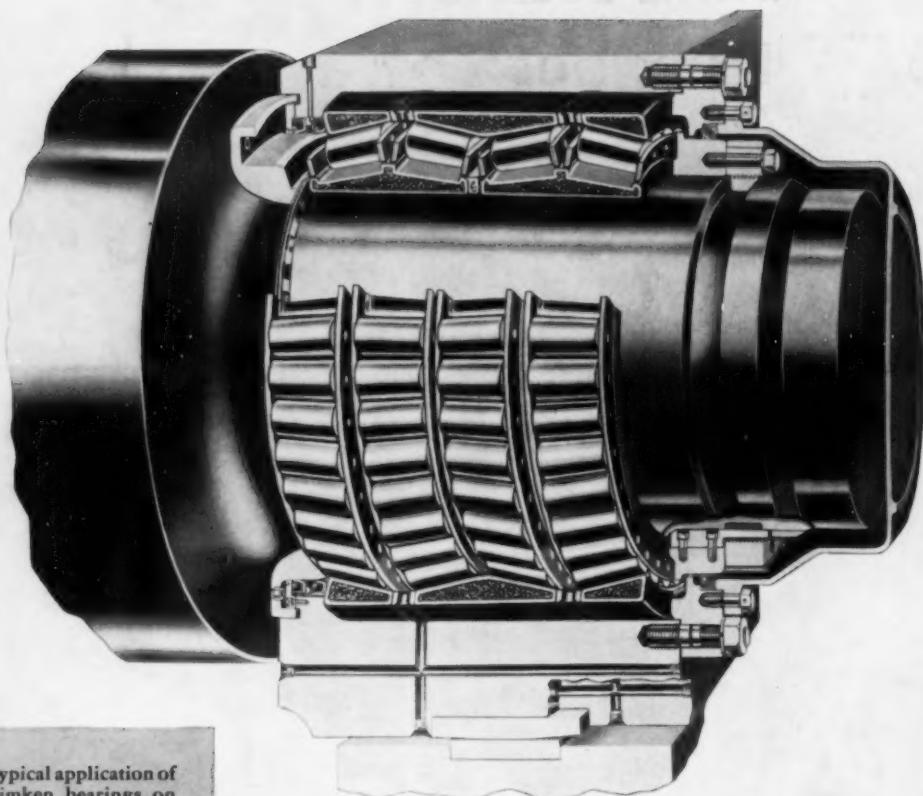


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